PRUEBA DE HABILIDADES DIPLOMADO CISCO-CCNA

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UNIVERSIDAD NACIONAL ABIERTA Y A DISTANCIA - UNAD
ESCUELA DE CIENCIAS BÁSICAS TECNOLOGÍA E INGENIERA
INGENIERIA DE TELECOMUNICACIONES
MONTELIBANO-CORDOBA
2019

PRUEBA DE HABILIDADES DIPLOMADO CISCO-CCNA

EDER LUIS GARCES PEREIRA

Informe detallado del desarrollo de la prueba de habilidades del diplomado de Cisco

Tutor

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CONTENIDO

INTRODUCCIÓN

Sobre la base establecida en los dos escenarios propuestos para el desarrollo de las actividades que ayudaran a la solución de la problemática establecida en cada caso, este trabajo busca conocer el grado de desarrollo de competencias y habilidades adquiridas a lo largo del diplomado de profundización en Cisco de la Universidad Nacional Abierta y a Distancia.

Durante el desarrollo de la actividad se encontraran los procedimientos de configuración desarrollados, así como las respectivas simulaciones que soportan la aplicabilidad y funcionalidad de cada procedimiento.

Los temas de análisis a ser tratados y que serán presentados a través de ejercicios prácticos son direccionamiento IP, protocolos de enrutamiento RIP, OSPF, servicio DHCP, PPP, NAT, redes LAN, NAT for IPv4, VLAN, comandos de verificación, entre otros aspectos que serán revisados y desarrollados a lo largo del siguiente trabajo.

RESUMEN

El presente informe contiene el desarrollo de los puntos solicitados en la evaluación correspondiente a la prueba de habilidades del diplomado de profundización en Cisco (diseño e implementación de soluciones integradas LAN y WAN) de la Universidad Nacional Abierta y Distancia – UNAD.

En la evaluación se presentan dos escenarios, el primero plantea la búsqueda de una solución a la problemática que presenta una empresa con sucursales en la ciudad de Medellín y Bogotá. Se tiene la necesidad de solicitar la configuración de una red de datos que permita mantener interconectadas a cada una de sus sucursales. Para ello se configurara e interconectara entre si cada uno de los dispositivos que hacen parte de las sucursales, acorde al uso del direccionamiento IP, protocolos de enrutamiento, y demás aspectos de la topología de red planteada.

El segundo escenario plantea la necesidad de una empresa de tecnología que cuenta con tres sucursales distribuidas en las ciudades de Miami, Bogotá y Buenos Aires. La empresa requiere la configuración e interconexión de cada uno de los dispositivos que forman parte del escenario a través del uso del direccionamiento IP, protocolos de enrutamiento y otros aspectos que ayudaran a la solución de la problemática planteada.

En el escenario uno se trabajara con protocolo de enrutamiento RIP, mientras que en el segundo escenario se utilizara el protocolo de enrutamiento OSPF.

EVALUACIÓN – PRUEBA DE HABILIDADES PRACTICAS CCNA

Escenario 1

Una empresa posee sucursales distribuidas en las ciudades de Bogotá y Medellín, en donde el estudiante será el administrador de la red, el cual deberá configurar e interconectar entre sí cada uno de los dispositivos que forman parte del escenario, acorde con los lineamientos establecidos para el direccionamiento IP, protocolos de enrutamiento y demás aspectos que

Topología de red

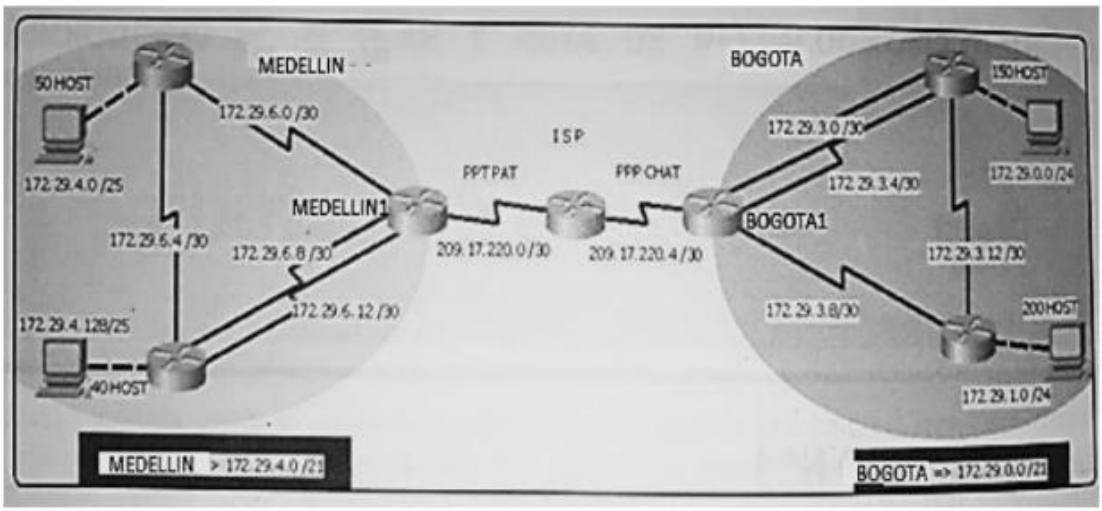


Imagen 1 – Topología de red

Este escenario plantea el uso de RIP como protocolo de enrutamiento, considerando que se tendran rutas por defecto redistribuidas; asimismo, habilitar el encapsulamiento PPP y su autenticación.

Los routers Bogota2 y medellin2 proporcionan el servicio DHCP a su propia red LAN y a los routers 3 de cada ciudad.

Debe configurar PPP en los enlaces hacia el ISP, con autenticación.

Debe habilitar NAT de sobrecarga en los routers Bogota1 y medellin1.

DESARROLLO

Realizar las rutinas de diagnóstico y dejar los equipos listos para su configuración (asignar nombres de equipos, asignar claves de seguridad, etc).

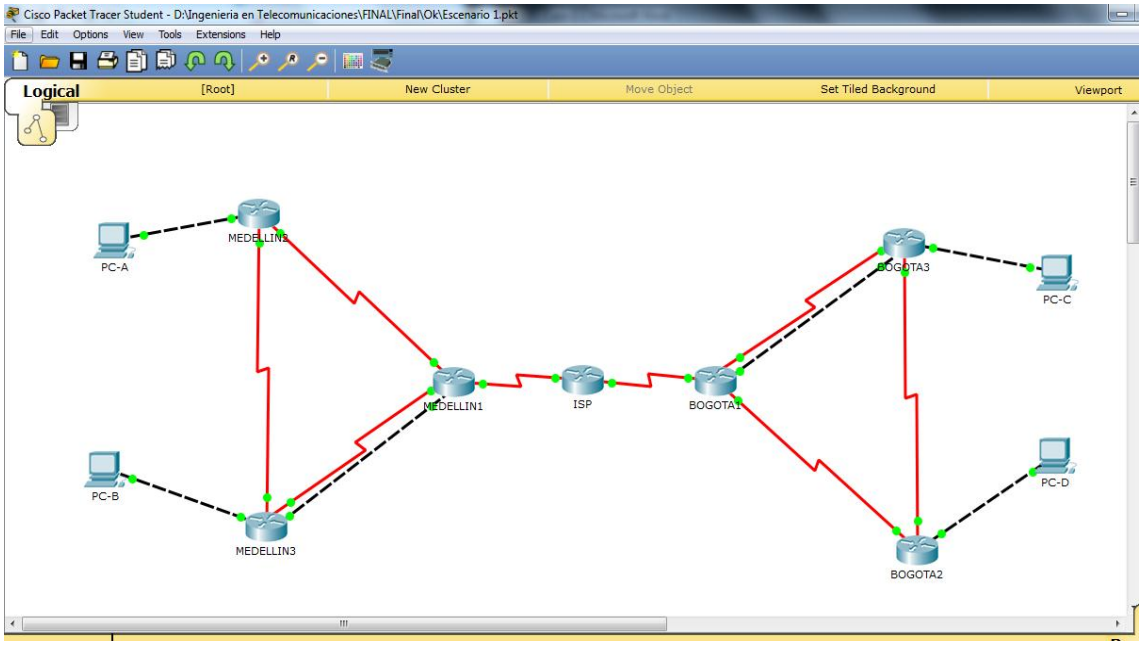


Imagen 2 – Topología de red PT

Rutinas de diagnóstico y configuración

Router MEDELLIN3

Router>enable
Router#config t
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#hostname MEDELLIN3
MEDELLIN3(config)#enable password ederunad
MEDELLIN3(config)#line vty 0 15
MEDELLIN3(config-line)#password ederunad1
MEDELLIN3(config-line)#login
MEDELLIN3(config-line)#exit
MEDELLIN3(config)#line console 0
MEDELLIN3(config-line)#password ederunad1
MEDELLIN3(config-line)#login
MEDELLIN3(config-line)#logging synchronous
MEDELLIN3(config-line)#exit

Router MEDELLIN2

Router>enable
Router#config t
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#hostname MEDELLIN2
MEDELLIN2(config)#enable password ederunad
MEDELLIN2(config)#line vty 0 15
MEDELLIN2(config-line)#password ederunad1
MEDELLIN2(config-line)#login
MEDELLIN2(config-line)#exit
MEDELLIN2(config)#line console 0
MEDELLIN2(config-line)#password ederunad1
MEDELLIN2(config-line)#login
MEDELLIN2(config-line)#logging synchronous
MEDELLIN2(config-line)#exit

Router MEDELLIN1

Router>enable
Router#config t
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#hostname MEDELLIN1
MEDELLIN1(config)#enable password ederunad
MEDELLIN1(config)#line vty 0 15
MEDELLIN1(config-line)#password ederunad1
MEDELLIN1(config-line)#login
MEDELLIN1(config-line)#exit
MEDELLIN1(config)#line console 0
MEDELLIN1(config-line)#password ederunad1
MEDELLIN1(config-line)#login
MEDELLIN1(config-line)#logging synchronous
MEDELLIN1(config-line)#exit

Router ISP

Router>enable
Router#config t
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#hostname ISP
ISP(config)#enable password ederunad
ISP(config)#line vty 0 15
ISP(config-line)#password ederunad1
ISP(config-line)#login
ISP(config-line)#exit
ISP(config)#line console 0
ISP(config-line)#password ederunad1
ISP(config-line)#login

ISP(config-line)#logging synchronous
ISP(config-line)#exit

Router BOGOTA1

Router>enable
Router#config t
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#hostname BOGOTA1
BOGOTA1(config)#enable password ederunad
BOGOTA1(config)#line vty 0 15
BOGOTA1(config-line)#password ederunad1
BOGOTA1(config-line)#login
BOGOTA1(config-line)#exit
BOGOTA1(config)#line console 0
BOGOTA1(config-line)#password ederunad1
BOGOTA1(config-line)#login
BOGOTA1(config-line)#logging synchronous
BOGOTA1(config-line)#exit

Router BOGOTA3

Router>enable
Router#confi t
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#hostname BOGOTA3
BOGOTA3(config)#enable password ederunad
BOGOTA3(config)#line vty 0 15
BOGOTA3(config-line)#password ederunad1
BOGOTA3(config-line)#login
BOGOTA3(config-line)#exit
BOGOTA3(config)#line console 0
BOGOTA3(config-line)#password ederunad1
BOGOTA3(config-line)#login
BOGOTA3(config-line)#logging synchronous
BOGOTA3(config-line)#exit

Router BOGOTA2

Router>enable
Router#config t
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#hostname BOGOTA2
BOGOTA2(config)#enable password ederunad
BOGOTA2(config)#line vty 0 15
BOGOTA2(config-line)#password ederunad1
BOGOTA2(config-line)#login

BOGOTA2(config-line)#exit
BOGOTA2(config)#line console 0
BOGOTA2(config-line)#password ederunad1
BOGOTA2(config-line)#login
BOGOTA2(config-line)#logging synchronous
BOGOTA2(config-line)#exit
BOGOTA2(config)#exit

Configuración de direccionamiento

Router MEDELLIN2

Password:
MEDELLIN2>enable
Password:
MEDELLIN2#conf t
Enter configuration commands, one per line. End with CNTL/Z.
MEDELLIN2(config)#int g0/0
MEDELLIN2(config-if)#ip add 172.29.4.1 255.255.255.128
MEDELLIN2(config-if)#no shutdown
MEDELLIN2(config-if)#
%LINK-5-CHANGED: Interface GigabitEthernet0/0, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet0/0, changed state to up
MEDELLIN2(config-if)#exit
MEDELLIN2(config)#int s0/0/1
MEDELLIN2(config-if)#ip add 172.29.6.1 255.255.255.252
MEDELLIN2(config-if)#clock rate 128000
MEDELLIN2(config-if)#no shutdown

%LINK-5-CHANGED: Interface Serial0/0/1, changed state to down
MEDELLIN2(config-if)#int s0/0/0
MEDELLIN2(config-if)#ip address 172.29.6.5 255.255.255.252
MEDELLIN2(config-if)#no shutdown
MEDELLIN2(config-if)#exit
MEDELLIN2(config)#exit
MEDELLIN2#
%SYS-5-CONFIG_I: Configured from console by console

Router MEDELLIN3

MEDELLIN3#conf t
Enter configuration commands, one per line. End with CNTL/Z.
MEDELLIN3(config)#int g0/0
MEDELLIN3(config-if)#ip address 172.29.4.129 255.255.255.128
MEDELLIN3(config-if)#no shutdown
MEDELLIN3(config-if)#int g0/1
MEDELLIN3(config-if)#ip address 172.29.6.9 255.255.255.252

MEDELLIN3(config-if)#no shutdown
MEDELLIN3(config-if)#int s0/0/0
MEDELLIN3(config-if)#ip address 172.29.6.6 255.255.255.252
MEDELLIN3(config-if)#clock rate 128000
MEDELLIN3(config-if)#no shutdown
MEDELLIN3(config-if)#int s0/0/1
MEDELLIN3(config-if)#ip address 172.29.6.13 255.255.255.252
MEDELLIN3(config-if)#clock rate 128000
MEDELLIN3(config-if)#no shutdown
MEDELLIN3(config-if)#exit

Router MEDELLIN1

MEDELLIN1#conf t
Enter configuration commands, one per line. End with CNTL/Z.
MEDELLIN1(config)#int g0/1
MEDELLIN1(config-if)#ip add 172.29.6.10 255.255.255.252
MEDELLIN1(config-if)#no shutdown
MEDELLIN1(config-if)#int s0/0/1
MEDELLIN1(config-if)#ip add 172.29.6.2 255.255.255.252
MEDELLIN1(config-if)#clock rate 128000
This command applies only to DCE interfaces
MEDELLIN1(config-if)#int s0/0/0
MEDELLIN1(config-if)#ip add 172.29.6.14 255.255.255.252
MEDELLIN1(config-if)#clock rate 128000
This command applies only to DCE interfaces
MEDELLIN1(config-if)#no shutdown
MEDELLIN1(config-if)#int s0/0/1
MEDELLIN1(config-if)#no shutdown
MEDELLIN1(config-if)#int s0/1/0
MEDELLIN1(config-if)#ip add 209.17.220.1 255.255.255.252
MEDELLIN1(config-if)#clock rate 128000
MEDELLIN1(config-if)#no shutdown
MEDELLIN1(config-if)#exit
MEDELLIN1(config)#

Router ISP

ISP#conf t
Enter configuration commands, one per line. End with CNTL/Z.
ISP(config)#int s0/0/0
ISP(config-if)#ip add 209.17.220.2 255.255.255.252
ISP(config-if)#clock rate 128000
This command applies only to DCE interfaces
ISP(config-if)#no shutdown
ISP(config-if)#int s0/0/1
ISP(config-if)#ip add 209.17.220.5 255.255.255.252
ISP(config-if)#clock rate 128000

ISP(config-if)#no shutdown
ISP(config-if)#exit
ISP(config)#

Router BOGOTA1

BOGOTA1>enable
Password:
BOGOTA1#conf t
Enter configuration commands, one per line. End with CNTL/Z.
BOGOTA1(config)#int s0/0/0
BOGOTA1(config-if)#ip add 209.17.220.6 255.255.255.252
BOGOTA1(config-if)#clock rate 128000
This command applies only to DCE interfaces
BOGOTA1(config-if)#no shutdown
BOGOTA1(config-if)#int s0/1/0
BOGOTA1(config-if)#ip add 172.29.3.5 255.255.255.252
BOGOTA1(config-if)#clock rate 128000
BOGOTA1(config-if)#no shutdown
BOGOTA1(config-if)#int g0/0
BOGOTA1(config-if)#ip add 172.29.3.1 255.255.255.252
BOGOTA1(config-if)#no shutdown
BOGOTA1(config-if)#int s0/0/1
BOGOTA1(config-if)#ip add 172.29.3.9 255.255.255.252
BOGOTA1(config-if)#clock rate 128000
BOGOTA1(config-if)#no shutdown
BOGOTA1(config-if)#exit
BOGOTA1(config)#

Router BOGOTA2

BOGOTA2>enable
Password:
BOGOTA2#con t
% Ambiguous command: "con t"
BOGOTA2#conf t
Enter configuration commands, one per line. End with CNTL/Z.
BOGOTA2(config)#int s0/0/0
BOGOTA2(config-if)#ip add 172.29.3.10 255.255.255.252
BOGOTA2(config-if)#clock rate 128000
This command applies only to DCE interfaces
BOGOTA2(config-if)#no shutdown
BOGOTA2(config-if)#int g0/0
BOGOTA2(config-if)#ip add 172.29.1.1 255.255.255.0
BOGOTA2(config-if)#clock rate 128000
^
% Invalid input detected at '^' marker.
BOGOTA2(config-if)#no shutdown

BOGOTA2(config-if)#int s0/0/1
BOGOTA2(config-if)#ip add 172.29.3.13 255.255.255.252
BOGOTA2(config-if)#clock rate 128000
This command applies only to DCE interfaces
BOGOTA2(config-if)#no shutdown

%LINK-5-CHANGED: Interface Serial0/0/1, changed state to down
BOGOTA2(config-if)#exit
BOGOTA2(config)#

Router BOGOTA3

BOGOTA3#conf t
Enter configuration commands, one per line. End with CNTL/Z.
BOGOTA3(config)#int s0/0/1
BOGOTA3(config-if)#ip add 172.29.3.14 255.255.255.252
BOGOTA3(config-if)#clock rate
% Incomplete command.
BOGOTA3(config-if)#clock rate 128000
BOGOTA3(config-if)#no shutdown

BOGOTA3(config-if)#
%LINK-5-CHANGED: Interface Serial0/0/1, changed state to up

BOGOTA3(config-if)#int s0/0
%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial0/0/1, changed state to up
BOGOTA3(config-if)#int g0/0
BOGOTA3(config-if)#ip add 172.29.0.1 255.255.255.252.0
^
% Invalid input detected at '^' marker.
BOGOTA3(config-if)#ip add 172.29.0.1 255.255.255.0
BOGOTA3(config-if)#no shtdown
^
% Invalid input detected at '^' marker.
BOGOTA3(config-if)#no shutdown
BOGOTA3(config-if)#int g0/1
BOGOTA3(config-if)#ip add 172.29.3.2 255.255.255.252
% 172.29.3.0 overlaps with Serial0/0/0
BOGOTA3(config-if)#int s0/0/0
BOGOTA3(config-if)#ip add 172.29.3.1 255.255.255.252
BOGOTA3(config-if)#clock rate 128000
This command applies only to DCE interfaces
BOGOTA3(config-if)#no shutdown
BOGOTA3(config-if)#int g0/1
BOGOTA3(config-if)#ip add 172.29.3.2 255.255.255.252
% 172.29.3.0 overlaps with Serial0/0/0
BOGOTA3(config-if)#int s0/0/0

BOGOTA3(config-if)#ip add 172.29.3.6 255.255.255.252
BOGOTA3(config-if)#clock rate 128000
This command applies only to DCE interfaces
BOGOTA3(config-if)#no shutdown
BOGOTA3(config-if)#int g0/1
BOGOTA3(config-if)#ip add 172.29.3.2 255.255.255.252
BOGOTA3(config-if)#no shutdown
BOGOTA3(config-if)#exit
BOGOTA3(config)#exit

Realizar la conexión física de los equipos con base en la topología de red

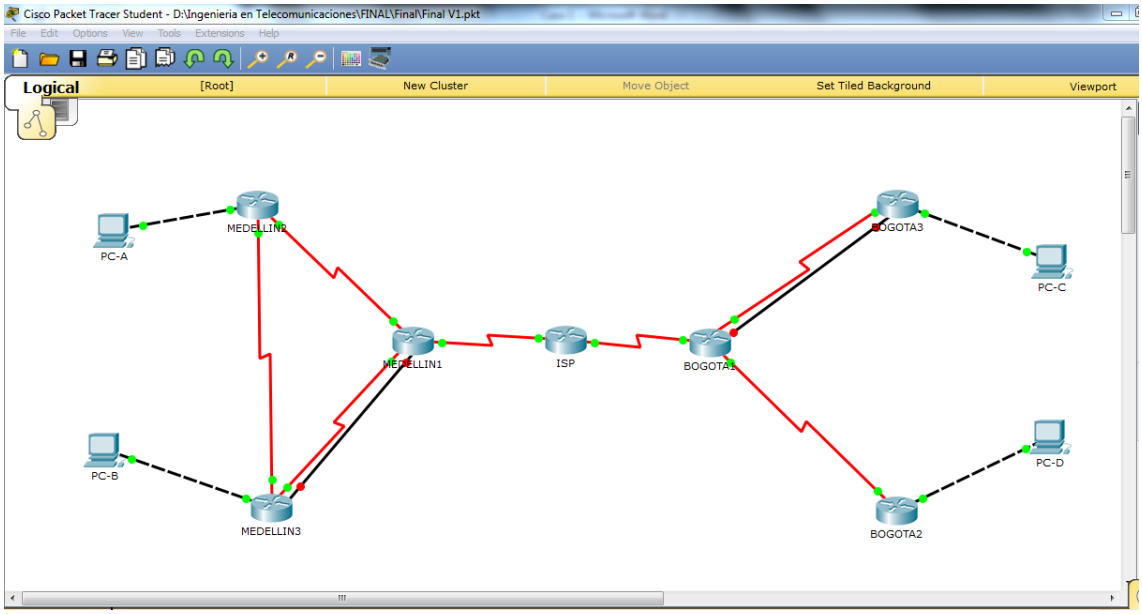


Imagen 3 – Conexión Física en PT

Parte1: Configuración del enrutamiento

a. Configurar el enrutamiento en la red usando el protocolo RIP versión 2, declare la red principal, desactive la sumarización automática.

Configuración RIP y sumarización en Router MEDELLIN2

MEDELLIN2#sho ip route
MEDELLIN2#sho ip route
Codes: L - local, C - connected, S - static, R - RIP, M - mobile, B - BGP
D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area
N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2
E1 - OSPF external type 1, E2 - OSPF external type 2, E - EGP
i - IS-IS, L1 - IS-IS level-1, L2 - IS-IS level-2, ia - IS-IS inter area
** - candidate default, U - per-user static route, o - ODR*
P - periodic downloaded static route

Gateway of last resort is not set

172.29.0.0/16 is variably subnetted, 9 subnets, 3 masks
C 172.29.4.0/25 is directly connected, GigabitEthernet0/0
L 172.29.4.1/32 is directly connected, GigabitEthernet0/0
R 172.29.4.128/25 [120/1] via 172.29.6.6, 00:00:23, Serial0/0/0
C 172.29.6.0/30 is directly connected, Serial0/0/1
L 172.29.6.1/32 is directly connected, Serial0/0/1
C 172.29.6.4/30 is directly connected, Serial0/0/0
L 172.29.6.5/32 is directly connected, Serial0/0/0
R 172.29.6.8/30 [120/1] via 172.29.6.6, 00:00:23, Serial0/0/0
R 172.29.6.12/30 [120/1] via 172.29.6.6, 00:00:23, Serial0/0/0
MEDELLIN2#conf t
Enter configuration commands, one per line. End with CNTL/Z.
MEDELLIN2(config)#router rip
MEDELLIN2(config-router)#version 2
MEDELLIN2(config-router)#net 172.29.4.0
MEDELLIN2(config-router)#net 172.29.4.1
MEDELLIN2(config-router)#net 172.29.4.128
MEDELLIN2(config-router)#net 172.29.6.0
MEDELLIN2(config-router)#net 172.29.6.1
MEDELLIN2(config-router)#net 172.29.6.4
MEDELLIN2(config-router)#net 172.29.6.5
MEDELLIN2(config-router)#net 172.29.6.8
MEDELLIN2(config-router)#net 172.29.6.12
MEDELLIN2(config-router)#no auto-summary
MEDELLIN2(config-router)#exit
MEDELLIN2(config)#exit
MEDELLIN2#

Configuración RIP y sumarización en Router MEDELLIN3

MEDELLIN3#sho ip route
Codes: L - local, C - connected, S - static, R - RIP, M - mobile, B - BGP
D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area
N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2
E1 - OSPF external type 1, E2 - OSPF external type 2, E - EGP
i - IS-IS, L1 - IS-IS level-1, L2 - IS-IS level-2, ia - IS-IS inter area
** - candidate default, U - per-user static route, o - ODR*
P - periodic downloaded static route

Gateway of last resort is not set

172.29.0.0/16 is variably subnetted, 8 subnets, 3 masks
R 172.29.4.0/25 [120/1] via 172.29.6.5, 00:00:24, Serial0/0/0
C 172.29.4.128/25 is directly connected, GigabitEthernet0/0
L 172.29.4.129/32 is directly connected, GigabitEthernet0/0
R 172.29.6.0/30 [120/1] via 172.29.6.5, 00:00:24, Serial0/0/0

C 172.29.6.4/30 is directly connected, Serial0/0/0
L 172.29.6.6/32 is directly connected, Serial0/0/0
C 172.29.6.12/30 is directly connected, Serial0/0/1
L 172.29.6.13/32 is directly connected, Serial0/0/1
MEDELLIN3#conf t
Enter configuration commands, one per line. End with CNTL/Z.
MEDELLIN3(config)#router rip
MEDELLIN3(config-router)#version 2
MEDELLIN3(config-router)#net 172.29.0.0
MEDELLIN3(config-router)#net 172.29.4.0
MEDELLIN3(config-router)#net 172.29.4.128
MEDELLIN3(config-router)#net 172.29.4.129
MEDELLIN3(config-router)#net 172.29.6.0
MEDELLIN3(config-router)#net 172.29.6.4
MEDELLIN3(config-router)#net 172.29.6.6
MEDELLIN3(config-router)#net 172.29.6.12
MEDELLIN3(config-router)#net 172.29.6.13
MEDELLIN3(config-router)#exit
MEDELLIN3(config)#exit

Configuración RIP y sumarización en Router MEDELLIN1

MEDELLIN1>enable
Password:
MEDELLIN1#sho ip route
Codes: L - local, C - connected, S - static, R - RIP, M - mobile, B - BGP
D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area
N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2
E1 - OSPF external type 1, E2 - OSPF external type 2, E - EGP
i - IS-IS, L1 - IS-IS level-1, L2 - IS-IS level-2, ia - IS-IS inter area
** - candidate default, U - per-user static route, o - ODR*
P - periodic downloaded static route

Gateway of last resort is not set

172.29.0.0/16 is variably subnetted, 7 subnets, 3 masks
R 172.29.4.0/25 [120/1] via 172.29.6.1, 00:00:09, Serial0/0/1
R 172.29.4.128/25 [120/1] via 172.29.6.13, 00:00:18, Serial0/0/0
C 172.29.6.0/30 is directly connected, Serial0/0/1
L 172.29.6.2/32 is directly connected, Serial0/0/1
R 172.29.6.4/30 [120/1] via 172.29.6.1, 00:00:09, Serial0/0/1
[120/1] via 172.29.6.13, 00:00:18, Serial0/0/0
C 172.29.6.12/30 is directly connected, Serial0/0/0
L 172.29.6.14/32 is directly connected, Serial0/0/0
MEDELLIN1#conf t
Enter configuration commands, one per line. End with CNTL/Z.
MEDELLIN1(config)#router rip
MEDELLIN1(config-router)#version 2

MEDELLIN1(config-router)#net
% Incomplete command.
MEDELLIN1(config-router)#net 172.29.4.0
MEDELLIN1(config-router)#net 172.29.4.1
MEDELLIN1(config-router)#net 172.29.4.128
MEDELLIN1(config-router)#net 172.29.6.0
MEDELLIN1(config-router)#net 172.29.6.2
MEDELLIN1(config-router)#net 172.29.6.4
MEDELLIN1(config-router)#net 172.29.6.12
MEDELLIN1(config-router)#net 172.29.6.14
MEDELLIN1(config-router)#net 209.17.220.1
MEDELLIN1(config-router)#net 209.17.220.2
MEDELLIN1(config-router)#no auto-summary
MEDELLIN1(config-router)#exit
MEDELLIN1(config)#exit
MEDELLIN1#
%SYS-5-CONFIG_I: Configured from console by console

Configuración RIP y sumarización en Router ISP

ISP#sho ip route
Codes: L - local, C - connected, S - static, R - RIP, M - mobile, B - BGP
D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area
N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2
E1 - OSPF external type 1, E2 - OSPF external type 2, E - EGP
i - IS-IS, L1 - IS-IS level-1, L2 - IS-IS level-2, ia - IS-IS inter area
** - candidate default, U - per-user static route, o - ODR*
P - periodic downloaded static route

Gateway of last resort is not set

209.17.220.0/24 is variably subnetted, 4 subnets, 2 masks
C 209.17.220.0/30 is directly connected, Serial0/0/0
L 209.17.220.2/32 is directly connected, Serial0/0/0
C 209.17.220.4/30 is directly connected, Serial0/0/1
L 209.17.220.5/32 is directly connected, Serial0/0/1
ISP#conf t
Enter configuration commands, one per line. End with CNTL/Z.
ISP(config)#conf t
%Invalid hex value
ISP(config)#router rip
ISP(config-router)#version 2
ISP(config-router)#net 209.17.220.0
ISP(config-router)#net 209.17.220.2
ISP(config-router)#net 209.17.220.4
ISP(config-router)#net 209.17.220.5
ISP(config-router)#no auto-summary
ISP(config-router)#exit

ISP(config)#exit
ISP#
%SYS-5-CONFIG_I: Configured from console by console

Configuración RIP y sumarización en Router BOGOTA1

BOGOTA1>enable
Password:
BOGOTA1#sh ip route
Codes: L - local, C - connected, S - static, R - RIP, M - mobile, B - BGP
D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area
N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2
E1 - OSPF external type 1, E2 - OSPF external type 2, E - EGP
i - IS-IS, L1 - IS-IS level-1, L2 - IS-IS level-2, ia - IS-IS inter area
** - candidate default, U - per-user static route, o - ODR*
P - periodic downloaded static route

Gateway of last resort is not set

172.29.0.0/16 is variably subnetted, 7 subnets, 3 masks
R 172.29.0.0/24 [120/1] via 172.29.3.6, 00:00:23, Serial0/1/0
R 172.29.1.0/24 [120/1] via 172.29.3.10, 00:00:27, Serial0/0/1
C 172.29.3.4/30 is directly connected, Serial0/1/0
L 172.29.3.5/32 is directly connected, Serial0/1/0
C 172.29.3.8/30 is directly connected, Serial0/0/1
L 172.29.3.9/32 is directly connected, Serial0/0/1
R 172.29.3.12/30 [120/1] via 172.29.3.6, 00:00:23, Serial0/1/0
[120/1] via 172.29.3.10, 00:00:27, Serial0/0/1
BOGOTA1#conf t
Enter configuration commands, one per line. End with CNTL/Z.
BOGOTA1(config)#router rip
BOGOTA1(config-router)#version 2
BOGOTA1(config-router)#net 172.29.0.0
BOGOTA1(config-router)#net 172.29.1.0
BOGOTA1(config-router)#net 172.29.3.4
BOGOTA1(config-router)#net 172.29.3.5
BOGOTA1(config-router)#net 172.29.3.8
BOGOTA1(config-router)#net 172.29.3.9
BOGOTA1(config-router)#net 172.29.3.12
BOGOTA1(config-router)#net 209.17.220.5
BOGOTA1(config-router)#net 209.17.220.6
BOGOTA1(config-router)#no auto-summary
BOGOTA1(config-router)#exit
BOGOTA1(config)#exit
BOGOTA1#
%SYS-5-CONFIG_I: Configured from console by console

Configuración RIP y sumarización en Router BOGOTA2

BOGOTA2>enable
Password:
BOGOTA2#sh ip route
Codes: L - local, C - connected, S - static, R - RIP, M - mobile, B - BGP
D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area
N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2
E1 - OSPF external type 1, E2 - OSPF external type 2, E - EGP
i - IS-IS, L1 - IS-IS level-1, L2 - IS-IS level-2, ia - IS-IS inter area
** - candidate default, U - per-user static route, o - ODR*
P - periodic downloaded static route

Gateway of last resort is not set

172.29.0.0/16 is variably subnetted, 9 subnets, 3 masks
R 172.29.0.0/24 [120/1] via 172.29.3.14, 00:00:04, Serial0/0/1
C 172.29.1.0/24 is directly connected, GigabitEthernet0/0
L 172.29.1.1/32 is directly connected, GigabitEthernet0/0
R 172.29.3.0/30 [120/1] via 172.29.3.9, 00:00:27, Serial0/0/0
[120/1] via 172.29.3.14, 00:00:04, Serial0/0/1
R 172.29.3.4/30 [120/1] via 172.29.3.9, 00:00:27, Serial0/0/0
[120/1] via 172.29.3.14, 00:00:04, Serial0/0/1
C 172.29.3.8/30 is directly connected, Serial0/0/0
L 172.29.3.10/32 is directly connected, Serial0/0/0
C 172.29.3.12/30 is directly connected, Serial0/0/1
L 172.29.3.13/32 is directly connected, Serial0/0/1
BOGOTA2#onf t
^
% Invalid input detected at '^' marker.
BOGOTA2#conf t
Enter configuration commands, one per line. End with CNTL/Z.
BOGOTA2(config)#router rip
BOGOTA2(config-router)#version 2
BOGOTA2(config-router)#net 172.29.0.0
BOGOTA2(config-router)#net 172.29.1.0
BOGOTA2(config-router)#net 172.29.1.1
BOGOTA2(config-router)#net 172.29.3.0
BOGOTA2(config-router)#net 172.29.3.4
BOGOTA2(config-router)#net 172.29.3.8
BOGOTA2(config-router)#net 172.29.3.10
BOGOTA2(config-router)#net 172.29.3.12
BOGOTA2(config-router)#net 172.29.3.13
BOGOTA2(config-router)#no auto-summary
BOGOTA2(config-router)#exit
BOGOTA2(config)#exit
BOGOTA2#

%SYS-5-CONFIG_I: Configured from console by console
Los routers Bogota1 y Medellín1 deberán añadir a su configuración de enrutamiento una ruta por defecto hacia el ISP y, a su vez, redistribuirla dentro de las publicaciones de RIP.

MEDELLIN1(config-if)#ip route 0.0.0.0 0.0.0.0 s0/1/0
BOGOTA1(config-if)#ip route 0.0.0.0 0.0.0.0 s0/0/0

Parte 2: Tabla de Enrutamiento.

a. Verificar la tabla de enrutamiento en cada uno de los routers para

Comprobar las redes y sus rutas.

MEDELLIN2#sh ip route
Codes: L - local, C - connected, S - static, R - RIP, M - mobile, B - BGP
D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area
N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2
E1 - OSPF external type 1, E2 - OSPF external type 2, E - EGP
i - IS-IS, L1 - IS-IS level-1, L2 - IS-IS level-2, ia - IS-IS inter area
** - candidate default, U - per-user static route, o - ODR*
P - periodic downloaded static route

Gateway of last resort is not set

172.29.0.0/16 is variably subnetted, 15 subnets, 4 masks
R 172.29.0.0/24 [120/4] via 172.29.6.2, 00:00:06, Serial0/0/1
R 172.29.1.0/24 [120/4] via 172.29.6.2, 00:00:06, Serial0/0/1
R 172.29.3.0/30 [120/3] via 172.29.6.2, 00:00:06, Serial0/0/1
R 172.29.3.4/30 [120/3] via 172.29.6.2, 00:00:06, Serial0/0/1
R 172.29.3.8/30 [120/3] via 172.29.6.2, 00:00:06, Serial0/0/1
R 172.29.3.12/30 [120/4] via 172.29.6.2, 00:00:06, Serial0/0/1
C 172.29.4.0/25 is directly connected, GigabitEthernet0/0
L 172.29.4.1/32 is directly connected, GigabitEthernet0/0
R 172.29.4.128/25 [120/1] via 172.29.6.6, 00:00:06, Serial0/0/0
C 172.29.6.0/30 is directly connected, Serial0/0/1
L 172.29.6.1/32 is directly connected, Serial0/0/1
C 172.29.6.4/30 is directly connected, Serial0/0/0
L 172.29.6.5/32 is directly connected, Serial0/0/0
R 172.29.6.8/30 [120/1] via 172.29.6.6, 00:00:06, Serial0/0/0
[120/1] via 172.29.6.2, 00:00:06, Serial0/0/1
R 172.29.6.12/30 [120/1] via 172.29.6.6, 00:00:06, Serial0/0/0
[120/1] via 172.29.6.2, 00:00:06, Serial0/0/1
209.17.220.0/30 is subnetted, 2 subnets
R 209.17.220.0/30 [120/1] via 172.29.6.2, 00:00:06, Serial0/0/1
R 209.17.220.4/30 [120/2] via 172.29.6.2, 00:00:06, Serial0/0/1

MEDELLIN3>enable
Password:
MEDELLIN3#sh ip route
Codes: L - local, C - connected, S - static, R - RIP, M - mobile, B - BGP
D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area
N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2
E1 - OSPF external type 1, E2 - OSPF external type 2, E - EGP
i - IS-IS, L1 - IS-IS level-1, L2 - IS-IS level-2, ia - IS-IS inter area
** - candidate default, U - per-user static route, o - ODR*
P - periodic downloaded static route

Gateway of last resort is not set

172.29.0.0/16 is variably subnetted, 16 subnets, 4 masks
R 172.29.0.0/24 [120/4] via 172.29.6.14, 00:00:00, Serial0/0/1
R 172.29.1.0/24 [120/4] via 172.29.6.14, 00:00:00, Serial0/0/1
R 172.29.3.0/30 [120/3] via 172.29.6.14, 00:00:00, Serial0/0/1
R 172.29.3.4/30 [120/3] via 172.29.6.14, 00:00:00, Serial0/0/1
R 172.29.3.8/30 [120/3] via 172.29.6.14, 00:00:00, Serial0/0/1
R 172.29.3.12/30 [120/4] via 172.29.6.14, 00:00:00, Serial0/0/1
R 172.29.4.0/25 [120/1] via 172.29.6.5, 00:00:04, Serial0/0/0
C 172.29.4.128/25 is directly connected, GigabitEthernet0/0
L 172.29.4.129/32 is directly connected, GigabitEthernet0/0
R 172.29.6.0/30 [120/1] via 172.29.6.5, 00:00:04, Serial0/0/0
[120/1] via 172.29.6.14, 00:00:00, Serial0/0/1
C 172.29.6.4/30 is directly connected, Serial0/0/0
L 172.29.6.6/32 is directly connected, Serial0/0/0
C 172.29.6.8/30 is directly connected, GigabitEthernet0/1
L 172.29.6.9/32 is directly connected, GigabitEthernet0/1
C 172.29.6.12/30 is directly connected, Serial0/0/1
L 172.29.6.13/32 is directly connected, Serial0/0/1
209.17.220.0/30 is subnetted, 2 subnets
R 209.17.220.0/30 [120/1] via 172.29.6.14, 00:00:00, Serial0/0/1
R 209.17.220.4/30 [120/2] via 172.29.6.14, 00:00:00, Serial0/0/1

MEDELLIN1>enable
Password:
MEDELLIN1#sh ip route
Codes: L - local, C - connected, S - static, R - RIP, M - mobile, B - BGP
D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area
N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2
E1 - OSPF external type 1, E2 - OSPF external type 2, E - EGP
i - IS-IS, L1 - IS-IS level-1, L2 - IS-IS level-2, ia - IS-IS inter area
** - candidate default, U - per-user static route, o - ODR*
P - periodic downloaded static route

Gateway of last resort is not set

172.29.0.0/16 is variably subnetted, 15 subnets, 4 masks
R 172.29.0.0/24 [120/3] via 209.17.220.2, 00:00:25, Serial0/1/0
R 172.29.1.0/24 [120/3] via 209.17.220.2, 00:00:25, Serial0/1/0
R 172.29.3.0/30 [120/2] via 209.17.220.2, 00:00:25, Serial0/1/0
R 172.29.3.4/30 [120/2] via 209.17.220.2, 00:00:25, Serial0/1/0
R 172.29.3.8/30 [120/2] via 209.17.220.2, 00:00:25, Serial0/1/0
R 172.29.3.12/30 [120/3] via 209.17.220.2, 00:00:25, Serial0/1/0
R 172.29.4.0/25 [120/1] via 172.29.6.1, 00:00:00, Serial0/0/1
R 172.29.4.128/25 [120/1] via 172.29.6.9, 00:00:24, GigabitEthernet0/1
[120/1] via 172.29.6.13, 00:00:24, Serial0/0/0
C 172.29.6.0/30 is directly connected, Serial0/0/1
L 172.29.6.2/32 is directly connected, Serial0/0/1
R 172.29.6.4/30 [120/1] via 172.29.6.9, 00:00:24, GigabitEthernet0/1
[120/1] via 172.29.6.13, 00:00:24, Serial0/0/0
[120/1] via 172.29.6.1, 00:00:00, Serial0/0/1
C 172.29.6.8/30 is directly connected, GigabitEthernet0/1
L 172.29.6.10/32 is directly connected, GigabitEthernet0/1
C 172.29.6.12/30 is directly connected, Serial0/0/0
L 172.29.6.14/32 is directly connected, Serial0/0/0
209.17.220.0/24 is variably subnetted, 3 subnets, 2 masks
C 209.17.220.0/30 is directly connected, Serial0/1/0
L 209.17.220.1/32 is directly connected, Serial0/1/0
R 209.17.220.4/30 [120/1] via 209.17.220.2, 00:00:25, Serial0/1/0

ISP>enable
Password:
ISP#sho ip route
Codes: L - local, C - connected, S - static, R - RIP, M - mobile, B - BGP
D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area
N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2
E1 - OSPF external type 1, E2 - OSPF external type 2, E - EGP
i - IS-IS, L1 - IS-IS level-1, L2 - IS-IS level-2, ia - IS-IS inter area
** - candidate default, U - per-user static route, o - ODR*
P - periodic downloaded static route

Gateway of last resort is not set

172.29.0.0/16 is variably subnetted, 12 subnets, 3 masks
R 172.29.0.0/24 [120/2] via 209.17.220.6, 00:00:19, Serial0/0/1
R 172.29.1.0/24 [120/2] via 209.17.220.6, 00:00:19, Serial0/0/1
R 172.29.3.0/30 [120/1] via 209.17.220.6, 00:00:19, Serial0/0/1
R 172.29.3.4/30 [120/1] via 209.17.220.6, 00:00:19, Serial0/0/1
R 172.29.3.8/30 [120/1] via 209.17.220.6, 00:00:19, Serial0/0/1
R 172.29.3.12/30 [120/2] via 209.17.220.6, 00:00:19, Serial0/0/1
R 172.29.4.0/25 [120/2] via 209.17.220.1, 00:00:16, Serial0/0/0
R 172.29.4.128/25 [120/2] via 209.17.220.1, 00:00:16, Serial0/0/0
R 172.29.6.0/30 [120/1] via 209.17.220.1, 00:00:16, Serial0/0/0
R 172.29.6.4/30 [120/2] via 209.17.220.1, 00:00:16, Serial0/0/0

R 172.29.6.8/30 [120/1] via 209.17.220.1, 00:00:16, Serial0/0/0
R 172.29.6.12/30 [120/1] via 209.17.220.1, 00:00:16, Serial0/0/0
209.17.220.0/24 is variably subnetted, 4 subnets, 2 masks
C 209.17.220.0/30 is directly connected, Serial0/0/0
L 209.17.220.2/32 is directly connected, Serial0/0/0
C 209.17.220.4/30 is directly connected, Serial0/0/1
L 209.17.220.5/32 is directly connected, Serial0/0/1

BOGOTA1>enable
Password:
BOGOTA1#sh ip route
Codes: L - local, C - connected, S - static, R - RIP, M - mobile, B - BGP
D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area
N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2
E1 - OSPF external type 1, E2 - OSPF external type 2, E - EGP
i - IS-IS, L1 - IS-IS level-1, L2 - IS-IS level-2, ia - IS-IS inter area
** - candidate default, U - per-user static route, o - ODR*
P - periodic downloaded static route

Gateway of last resort is not set

172.29.0.0/16 is variably subnetted, 15 subnets, 4 masks
R 172.29.0.0/24 [120/1] via 172.29.3.2, 00:00:06, GigabitEthernet0/0
[120/1] via 172.29.3.6, 00:00:06, Serial0/1/0
R 172.29.1.0/24 [120/1] via 172.29.3.10, 00:00:13, Serial0/0/1
C 172.29.3.0/30 is directly connected, GigabitEthernet0/0
L 172.29.3.1/32 is directly connected, GigabitEthernet0/0
C 172.29.3.4/30 is directly connected, Serial0/1/0
L 172.29.3.5/32 is directly connected, Serial0/1/0
C 172.29.3.8/30 is directly connected, Serial0/0/1
L 172.29.3.9/32 is directly connected, Serial0/0/1
R 172.29.3.12/30 [120/1] via 172.29.3.2, 00:00:06, GigabitEthernet0/0
[120/1] via 172.29.3.6, 00:00:06, Serial0/1/0
[120/1] via 172.29.3.10, 00:00:13, Serial0/0/1
R 172.29.4.0/25 [120/3] via 209.17.220.5, 00:00:13, Serial0/0/0
R 172.29.4.128/25 [120/3] via 209.17.220.5, 00:00:13, Serial0/0/0
R 172.29.6.0/30 [120/2] via 209.17.220.5, 00:00:13, Serial0/0/0
R 172.29.6.4/30 [120/3] via 209.17.220.5, 00:00:13, Serial0/0/0
R 172.29.6.8/30 [120/2] via 209.17.220.5, 00:00:13, Serial0/0/0
R 172.29.6.12/30 [120/2] via 209.17.220.5, 00:00:13, Serial0/0/0
209.17.220.0/24 is variably subnetted, 3 subnets, 2 masks
R 209.17.220.0/30 [120/1] via 209.17.220.5, 00:00:13, Serial0/0/0
C 209.17.220.4/30 is directly connected, Serial0/0/0
L 209.17.220.6/32 is directly connected, Serial0/0/0

BOGOTA2>enable
Password:
BOGOTA2#sh ip route
Codes: L - local, C - connected, S - static, R - RIP, M - mobile, B - BGP
D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area
N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2
E1 - OSPF external type 1, E2 - OSPF external type 2, E - EGP
i - IS-IS, L1 - IS-IS level-1, L2 - IS-IS level-2, ia - IS-IS inter area
** - candidate default, U - per-user static route, o - ODR*
P - periodic downloaded static route

Gateway of last resort is not set

172.29.0.0/16 is variably subnetted, 15 subnets, 4 masks
R 172.29.0.0/24 [120/1] via 172.29.3.14, 00:00:10, Serial0/0/1
C 172.29.1.0/24 is directly connected, GigabitEthernet0/0
L 172.29.1.1/32 is directly connected, GigabitEthernet0/0
R 172.29.3.0/30 [120/1] via 172.29.3.14, 00:00:10, Serial0/0/1
[120/1] via 172.29.3.9, 00:00:21, Serial0/0/0
R 172.29.3.4/30 [120/1] via 172.29.3.14, 00:00:10, Serial0/0/1
[120/1] via 172.29.3.9, 00:00:21, Serial0/0/0
C 172.29.3.8/30 is directly connected, Serial0/0/0
L 172.29.3.10/32 is directly connected, Serial0/0/0
C 172.29.3.12/30 is directly connected, Serial0/0/1
L 172.29.3.13/32 is directly connected, Serial0/0/1
R 172.29.4.0/25 [120/4] via 172.29.3.9, 00:00:21, Serial0/0/0
R 172.29.4.128/25 [120/4] via 172.29.3.9, 00:00:21, Serial0/0/0
R 172.29.6.0/30 [120/3] via 172.29.3.9, 00:00:21, Serial0/0/0
R 172.29.6.4/30 [120/4] via 172.29.3.9, 00:00:21, Serial0/0/0
R 172.29.6.8/30 [120/3] via 172.29.3.9, 00:00:21, Serial0/0/0
R 172.29.6.12/30 [120/3] via 172.29.3.9, 00:00:21, Serial0/0/0
209.17.220.0/30 is subnetted, 2 subnets
R 209.17.220.0/30 [120/2] via 172.29.3.9, 00:00:21, Serial0/0/0
R 209.17.220.4/30 [120/1] via 172.29.3.9, 00:00:21, Serial0/0/0

BOGOTA3>enable
Password:
BOGOTA3#sh ip route
Codes: L - local, C - connected, S - static, R - RIP, M - mobile, B - BGP
D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area
N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2
E1 - OSPF external type 1, E2 - OSPF external type 2, E - EGP
i - IS-IS, L1 - IS-IS level-1, L2 - IS-IS level-2, ia - IS-IS inter area
** - candidate default, U - per-user static route, o - ODR*
P - periodic downloaded static route

Gateway of last resort is not set

172.29.0.0/16 is variably subnetted, 16 subnets, 4 masks
C 172.29.0.0/24 is directly connected, GigabitEthernet0/0
L 172.29.0.1/32 is directly connected, GigabitEthernet0/0
R 172.29.1.0/24 [120/1] via 172.29.3.13, 00:00:21, Serial0/0/1
C 172.29.3.0/30 is directly connected, GigabitEthernet0/1
L 172.29.3.2/32 is directly connected, GigabitEthernet0/1
C 172.29.3.4/30 is directly connected, Serial0/0/0
L 172.29.3.6/32 is directly connected, Serial0/0/0
R 172.29.3.8/30 [120/1] via 172.29.3.5, 00:00:21, Serial0/0/0
[120/1] via 172.29.3.13, 00:00:21, Serial0/0/1
C 172.29.3.12/30 is directly connected, Serial0/0/1
L 172.29.3.14/32 is directly connected, Serial0/0/1
R 172.29.4.0/25 [120/4] via 172.29.3.5, 00:00:21, Serial0/0/0
R 172.29.4.128/25 [120/4] via 172.29.3.5, 00:00:21, Serial0/0/0
R 172.29.6.0/30 [120/3] via 172.29.3.5, 00:00:21, Serial0/0/0
R 172.29.6.4/30 [120/4] via 172.29.3.5, 00:00:21, Serial0/0/0
R 172.29.6.8/30 [120/3] via 172.29.3.5, 00:00:21, Serial0/0/0
R 172.29.6.12/30 [120/3] via 172.29.3.5, 00:00:21, Serial0/0/0
209.17.220.0/30 is subnetted, 2 subnets
R 209.17.220.0/30 [120/2] via 172.29.3.5, 00:00:21, Serial0/0/0
R 209.17.220.4/30 [120/1] via 172.29.3.5, 00:00:21, Serial0/0/0

b. Verificar el balanceo de carga que presentan los routers.

MEDELLIN2#sh ip route 172.29.0.0
Routing entry for 172.29.0.0/16, 15 known subnets
Attached (6 connections)
Variably subnetted with 4 masks
Redistributing via rip, rip, rip, rip, rip, rip, rip, rip, rip, rip, rip, rip, rip, rip
R 172.29.0.0/24 [120/4] via 172.29.6.2, 00:00:16, Serial0/0/1
R 172.29.1.0/24 [120/4] via 172.29.6.2, 00:00:16, Serial0/0/1
R 172.29.3.0/30 [120/3] via 172.29.6.2, 00:00:16, Serial0/0/1
R 172.29.3.4/30 [120/3] via 172.29.6.2, 00:00:16, Serial0/0/1
R 172.29.3.8/30 [120/3] via 172.29.6.2, 00:00:16, Serial0/0/1
R 172.29.3.12/30 [120/4] via 172.29.6.2, 00:00:16, Serial0/0/1
C 172.29.4.0/25 is directly connected, GigabitEthernet0/0
172.29.4.1/32 is directly connected, GigabitEthernet0/0
R 172.29.4.128/25 [120/1] via 172.29.6.6, 00:00:22, Serial0/0/0
C 172.29.6.0/30 is directly connected, Serial0/0/1
172.29.6.1/32 is directly connected, Serial0/0/1
C 172.29.6.4/30 is directly connected, Serial0/0/0
172.29.6.5/32 is directly connected, Serial0/0/0
R 172.29.6.8/30 [120/1] via 172.29.6.6, 00:00:22, Serial0/0/0
[120/1] via 172.29.6.2, 00:00:16, Serial0/0/1
R 172.29.6.12/30 [120/1] via 172.29.6.6, 00:00:22, Serial0/0/0
[120/1] via 172.29.6.2, 00:00:16, Serial0/0/1

MEDELLIN3#sh ip route 172.29.0.0
Routing entry for 172.29.0.0/16, 16 known subnets
Attached (8 connections)
Variably subnetted with 4 masks
Redistributing via rip, rip, rip, rip, rip, rip, rip, rip, rip, rip, rip, rip, rip
R 172.29.0.0/24 [120/4] via 172.29.6.14, 00:00:14, Serial0/0/1
R 172.29.1.0/24 [120/4] via 172.29.6.14, 00:00:14, Serial0/0/1
R 172.29.3.0/30 [120/3] via 172.29.6.14, 00:00:14, Serial0/0/1
R 172.29.3.4/30 [120/3] via 172.29.6.14, 00:00:14, Serial0/0/1
R 172.29.3.8/30 [120/3] via 172.29.6.14, 00:00:14, Serial0/0/1
R 172.29.3.12/30 [120/4] via 172.29.6.14, 00:00:14, Serial0/0/1
R 172.29.4.0/25 [120/1] via 172.29.6.5, 00:00:19, Serial0/0/0
C 172.29.4.128/25 is directly connected, GigabitEthernet0/0
172.29.4.129/32 is directly connected, GigabitEthernet0/0
R 172.29.6.0/30 [120/1] via 172.29.6.5, 00:00:19, Serial0/0/0
[120/1] via 172.29.6.14, 00:00:14, Serial0/0/1
C 172.29.6.4/30 is directly connected, Serial0/0/0
172.29.6.6/32 is directly connected, Serial0/0/0
C 172.29.6.8/30 is directly connected, GigabitEthernet0/1
172.29.6.9/32 is directly connected, GigabitEthernet0/1
C 172.29.6.12/30 is directly connected, Serial0/0/1
172.29.6.13/32 is directly connected, Serial0/0/1

MEDELLIN1#sh ip route 172.29.0.0
Routing entry for 172.29.0.0/16, 15 known subnets
Attached (6 connections)
Variably subnetted with 4 masks
Redistributing via rip, rip, rip, rip, rip, rip, rip, rip, rip, rip, rip, rip, rip, rip, rip
R 172.29.0.0/24 [120/3] via 209.17.220.2, 00:00:04, Serial0/1/0
R 172.29.1.0/24 [120/3] via 209.17.220.2, 00:00:04, Serial0/1/0
R 172.29.3.0/30 [120/2] via 209.17.220.2, 00:00:04, Serial0/1/0
R 172.29.3.4/30 [120/2] via 209.17.220.2, 00:00:04, Serial0/1/0
R 172.29.3.8/30 [120/2] via 209.17.220.2, 00:00:04, Serial0/1/0
R 172.29.3.12/30 [120/3] via 209.17.220.2, 00:00:04, Serial0/1/0
R 172.29.4.0/25 [120/1] via 172.29.6.1, 00:00:08, Serial0/0/1
R 172.29.4.128/25 [120/1] via 172.29.6.9, 00:00:04, GigabitEthernet0/1
[120/1] via 172.29.6.13, 00:00:04, Serial0/0/0
C 172.29.6.0/30 is directly connected, Serial0/0/1
172.29.6.2/32 is directly connected, Serial0/0/1
R 172.29.6.4/30 [120/1] via 172.29.6.9, 00:00:04, GigabitEthernet0/1
[120/1] via 172.29.6.13, 00:00:04, Serial0/0/0
[120/1] via 172.29.6.1, 00:00:08, Serial0/0/1
C 172.29.6.8/30 is directly connected, GigabitEthernet0/1
172.29.6.10/32 is directly connected, GigabitEthernet0/1
C 172.29.6.12/30 is directly connected, Serial0/0/0
172.29.6.14/32 is directly connected, Serial0/0/0

ISP#sho ip route 172.29.0.0
Routing entry for 172.29.0.0/16, 12 known subnets
Variably subnetted with 3 masks
Redistributing via rip, rip, rip, rip, rip, rip, rip, rip, rip, rip, rip, rip
R 172.29.0.0/24 [120/2] via 209.17.220.6, 00:00:18, Serial0/0/1
R 172.29.1.0/24 [120/2] via 209.17.220.6, 00:00:18, Serial0/0/1
R 172.29.3.0/30 [120/1] via 209.17.220.6, 00:00:18, Serial0/0/1
R 172.29.3.4/30 [120/1] via 209.17.220.6, 00:00:18, Serial0/0/1
R 172.29.3.8/30 [120/1] via 209.17.220.6, 00:00:18, Serial0/0/1
R 172.29.3.12/30 [120/2] via 209.17.220.6, 00:00:18, Serial0/0/1
R 172.29.4.0/25 [120/2] via 209.17.220.1, 00:00:17, Serial0/0/0
R 172.29.4.128/25 [120/2] via 209.17.220.1, 00:00:17, Serial0/0/0
R 172.29.6.0/30 [120/1] via 209.17.220.1, 00:00:17, Serial0/0/0
R 172.29.6.4/30 [120/2] via 209.17.220.1, 00:00:17, Serial0/0/0
R 172.29.6.8/30 [120/1] via 209.17.220.1, 00:00:17, Serial0/0/0
R 172.29.6.12/30 [120/1] via 209.17.220.1, 00:00:17, Serial0/0/0

BOGOTA1#sh ip route 172.29.0.0
Routing entry for 172.29.0.0/16, 15 known subnets
Attached (6 connections)
Variably subnetted with 4 masks
Redistributing via rip, rip, rip, rip, rip, rip, rip, rip, rip, rip, rip, rip, rip, rip, rip
R 172.29.0.0/24 [120/1] via 172.29.3.2, 00:00:03, GigabitEthernet0/0
[120/1] via 172.29.3.6, 00:00:03, Serial0/1/0
R 172.29.1.0/24 [120/1] via 172.29.3.10, 00:00:13, Serial0/0/1
C 172.29.3.0/30 is directly connected, GigabitEthernet0/0
172.29.3.1/32 is directly connected, GigabitEthernet0/0
C 172.29.3.4/30 is directly connected, Serial0/1/0
172.29.3.5/32 is directly connected, Serial0/1/0
C 172.29.3.8/30 is directly connected, Serial0/0/1
172.29.3.9/32 is directly connected, Serial0/0/1
R 172.29.3.12/30 [120/1] via 172.29.3.2, 00:00:03, GigabitEthernet0/0
[120/1] via 172.29.3.6, 00:00:03, Serial0/1/0
[120/1] via 172.29.3.10, 00:00:13, Serial0/0/1
R 172.29.4.0/25 [120/3] via 209.17.220.5, 00:00:08, Serial0/0/0
R 172.29.4.128/25 [120/3] via 209.17.220.5, 00:00:08, Serial0/0/0
R 172.29.6.0/30 [120/2] via 209.17.220.5, 00:00:08, Serial0/0/0
R 172.29.6.4/30 [120/3] via 209.17.220.5, 00:00:08, Serial0/0/0
R 172.29.6.8/30 [120/2] via 209.17.220.5, 00:00:08, Serial0/0/0
R 172.29.6.12/30 [120/2] via 209.17.220.5, 00:00:08, Serial0/0/0

BOGOTA2#sh ip route 172.29.0.0
Routing entry for 172.29.0.0/16, 15 known subnets
Attached (6 connections)
Variably subnetted with 4 masks
Redistributing via rip, rip, rip, rip, rip, rip, rip, rip, rip, rip, rip, rip, rip, rip, rip
R 172.29.0.0/24 [120/1] via 172.29.3.14, 00:00:22, Serial0/0/1
C 172.29.1.0/24 is directly connected, GigabitEthernet0/0

172.29.1.1/32 is directly connected, GigabitEthernet0/0
R 172.29.3.0/30 [120/1] via 172.29.3.14, 00:00:22, Serial0/0/1
[120/1] via 172.29.3.9, 00:00:25, Serial0/0/0
R 172.29.3.4/30 [120/1] via 172.29.3.14, 00:00:22, Serial0/0/1
[120/1] via 172.29.3.9, 00:00:25, Serial0/0/0
C 172.29.3.8/30 is directly connected, Serial0/0/0
172.29.3.10/32 is directly connected, Serial0/0/0
C 172.29.3.12/30 is directly connected, Serial0/0/1
172.29.3.13/32 is directly connected, Serial0/0/1
R 172.29.4.0/25 [120/4] via 172.29.3.9, 00:00:25, Serial0/0/0
R 172.29.4.128/25 [120/4] via 172.29.3.9, 00:00:25, Serial0/0/0
R 172.29.6.0/30 [120/3] via 172.29.3.9, 00:00:25, Serial0/0/0
R 172.29.6.4/30 [120/4] via 172.29.3.9, 00:00:25, Serial0/0/0
R 172.29.6.8/30 [120/3] via 172.29.3.9, 00:00:25, Serial0/0/0
R 172.29.6.12/30 [120/3] via 172.29.3.9, 00:00:25, Serial0/0/0

BOGOTA3#sh ip route 172.29.0.0
Routing entry for 172.29.0.0/16, 16 known subnets
Attached (8 connections)
Variably subnetted with 4 masks
Redistributing via rip, rip, rip, rip, rip, rip, rip, rip, rip, rip, rip, rip, rip
C 172.29.0.0/24 is directly connected, GigabitEthernet0/0
172.29.0.1/32 is directly connected, GigabitEthernet0/0
R 172.29.1.0/24 [120/1] via 172.29.3.13, 00:00:22, Serial0/0/1
C 172.29.3.0/30 is directly connected, GigabitEthernet0/1
172.29.3.2/32 is directly connected, GigabitEthernet0/1
C 172.29.3.4/30 is directly connected, Serial0/0/0
172.29.3.6/32 is directly connected, Serial0/0/0
R 172.29.3.8/30 [120/1] via 172.29.3.5, 00:00:14, Serial0/0/0
[120/1] via 172.29.3.13, 00:00:22, Serial0/0/1
C 172.29.3.12/30 is directly connected, Serial0/0/1
172.29.3.14/32 is directly connected, Serial0/0/1
R 172.29.4.0/25 [120/4] via 172.29.3.5, 00:00:14, Serial0/0/0
R 172.29.4.128/25 [120/4] via 172.29.3.5, 00:00:14, Serial0/0/0
R 172.29.6.0/30 [120/3] via 172.29.3.5, 00:00:14, Serial0/0/0
R 172.29.6.4/30 [120/4] via 172.29.3.5, 00:00:14, Serial0/0/0
R 172.29.6.8/30 [120/3] via 172.29.3.5, 00:00:14, Serial0/0/0
R 172.29.6.12/30 [120/3] via 172.29.3.5, 00:00:14, Serial0/0/0

c. Obsérvese en los routers Bogotá1 y Medellín1 cierta similitud por su ubicación, por tener dos enlaces de conexión hacia otro router y por la ruta por defecto que manejan.
   Verificado

d. Los routers Medellín2 y Bogotá2 también presentan redes conectadas directamente y recibidas mediante RIP.
   Verficado

e. Las tablas de los routers restantes deben permitir visualizar rutas redundantes para el caso de la ruta por defecto.
Verificado

f. El router ISP solo debe indicar sus rutas estáticas adicionales a las directamente conectadas.
Verificado.

Parte 3: Deshabilitar la propagación del protocolo RIP.

Para no propagar las publicaciones por interfaces que no lo requieran se debe deshabilitar la propagación del protocolo RIP, en la siguiente tabla se indican las interfaces de cada router que no necesitan desactivación.

Tabla 1. Interfaz Router

ROUTER	**INTERFAZ**
Bogota1	SERIAL0/0/1; SERIAL0/1/0; SERIAL0/1/1
Bogota2	SERIAL0/0/0; SERIAL0/0/1
Bogota3	SERIAL0/0/0; SERIAL0/0/1; SERIAL0/1/0
Medellín1	SERIAL0/0/0; SERIAL0/0/1; SERIAL0/1/1
Medellín2	SERIAL0/0/0; SERIAL0/0/1
Medellín3	SERIAL0/0/0; SERIAL0/0/1; SERIAL0/1/0
ISP	No lo requiere

Des habilitación de la propagación RIP en MEDELLIN2

MEDELLIN2>enable
Password:
MEDELLIN2#config t
Enter configuration commands, one per line. End with CNTL/Z.
MEDELLIN2(config)#router rip
MEDELLIN2(config-router)#passive-interface G0/0
MEDELLIN2(config-router)#end
MEDELLIN2#
%SYS-5-CONFIG_I: Configured from console by console

Des habilitación de la propagación RIP en MEDELLIN3

MEDELLIN3>enable
Password:
MEDELLIN3#config t
Enter configuration commands, one per line. End with CNTL/Z.
MEDELLIN3(config)#router rip
MEDELLIN3(config-router)#passive-interface G0/0
MEDELLIN3(config-router)#end
MEDELLIN3#
%SYS-5-CONFIG_I: Configured from console by console

Des habilitación de la propagación RIP en MEDELLIN1

MEDELLIN1(config-router)#passive-interface G0/1
MEDELLIN1(config-router)#end
MEDELLIN1#
%SYS-5-CONFIG_I: Configured from console by console

Des habilitación de la propagación RIP en BOGOTA1

BOGOTA1>enable
Password:
BOGOTA1#config t
Enter configuration commands, one per line. End with CNTL/Z.
BOGOTA1(config)#router rip
BOGOTA1(config-router)#passive-interface G0/0
BOGOTA1(config-router)#end
BOGOTA1#
%SYS-5-CONFIG_I: Configured from console by console

Des habilitación de la propagación RIP en BOGOTA3

BOGOTA3(config)#router rip
BOGOTA3(config-router)#passive-interface G0/0
BOGOTA3(config-router)#
BOGOTA3(config-router)#end
BOGOTA3#
%SYS-5-CONFIG_I: Configured from console by console

Des habilitación de la propagación RIP en BOGOTA2

BOGOTA2>enable
Password:
BOGOTA2#confi t
Enter configuration commands, one per line. End with CNTL/Z.
BOGOTA2(config)#router rip
BOGOTA2(config-router)#passive-interface G0/0
BOGOTA2(config-router)#end

BOGOTA2#
%SYS-5-CONFIG_I: Configured from console by console

Parte 4: Verificación del protocolo RIP.

a. Verificar y documentar las opciones de enrutamiento configuradas en los routers, como el passive interface para la conexión hacia el ISP, la versión de RIP y las interfaces que participan de la publicación entre otros datos.

MEDELLIN2#sh ip protocol
Routing Protocol is "rip"
Sending updates every 30 seconds, next due in 15 seconds
Invalid after 180 seconds, hold down 180, flushed after 240
Outgoing update filter list for all interfaces is not set
Incoming update filter list for all interfaces is not set
Redistributing: rip
Default version control: send version 2, receive 2
Interface Send Recv Triggered RIP Key-chain
Serial0/0/1 2 2
Serial0/0/0 2 2
Automatic network summarization is not in effect
Maximum path: 4
Routing for Networks:
172.29.0.0
192.29.6.0
Passive Interface(s):
GigabitEthernet0/0
Routing Information Sources:
Gateway Distance Last Update
172.29.6.2 120 00:00:11
172.29.6.6 120 00:00:07
Distance: (default is 120)

MEDELLIN3#sh ip protocol
Routing Protocol is "rip"
Sending updates every 30 seconds, next due in 21 seconds
Invalid after 180 seconds, hold down 180, flushed after 240
Outgoing update filter list for all interfaces is not set
Incoming update filter list for all interfaces is not set
Redistributing: rip
Default version control: send version 2, receive 2
Interface Send Recv Triggered RIP Key-chain
GigabitEthernet0/1 2 2
Serial0/0/1 2 2
Serial0/0/0 2 2
Automatic network summarization is not in effect
Maximum path: 4

Routing for Networks:
172.29.0.0
192.29.3.0
192.29.6.0
192.168.6.0
Passive Interface(s):
GigabitEthernet0/0
Routing Information Sources:
Gateway Distance Last Update
172.29.6.14 120 00:00:09
172.29.6.5 120 00:00:08
Distance: (default is 120)

MEDELLIN1#sh ip protocol
Routing Protocol is "rip"
Sending updates every 30 seconds, next due in 25 seconds
Invalid after 180 seconds, hold down 180, flushed after 240
Outgoing update filter list for all interfaces is not set
Incoming update filter list for all interfaces is not set
Redistributing: rip
Default version control: send version 2, receive 2
Interface Send Recv Triggered RIP Key-chain
Serial0/1/0 2 2
Serial0/0/0 2 2
Serial0/0/1 2 2
Automatic network summarization is not in effect
Maximum path: 4
Routing for Networks:
172.29.0.0
192.168.6.0
209.17.220.0
Passive Interface(s):
GigabitEthernet0/1
Routing Information Sources:
Gateway Distance Last Update
209.17.220.2 120 00:00:00
172.29.6.1 120 00:00:25
172.29.6.9 120 00:00:21
172.29.6.13 120 00:00:21
Distance: (default is 120)
ISP#sho ip route protocol
Translating "protocol"...domain server (255.255.255.255)
% Invalid input detected
ISP#sho ip protocol
Routing Protocol is "rip"
Sending updates every 30 seconds, next due in 25 seconds
Invalid after 180 seconds, hold down 180, flushed after 240
Outgoing update filter list for all interfaces is not set

Incoming update filter list for all interfaces is not set
Redistributing: rip
Default version control: send version 2, receive 2
Interface Send Recv Triggered RIP Key-chain
Serial0/0/1 2 2
Serial0/0/0 2 2
Automatic network summarization is not in effect
Maximum path: 4
Routing for Networks:
209.17.220.0
Passive Interface(s):
Routing Information Sources:
Gateway Distance Last Update
209.17.220.6 120 00:00:13
209.17.220.1 120 00:00:01
Distance: (default is 120)

BOGOTA1#sh ip protocol
Routing Protocol is "rip"
Sending updates every 30 seconds, next due in 22 seconds
Invalid after 180 seconds, hold down 180, flushed after 240
Outgoing update filter list for all interfaces is not set
Incoming update filter list for all interfaces is not set
Redistributing: rip
Default version control: send version 2, receive 2
Interface Send Recv Triggered RIP Key-chain
Serial0/0/1 2 2
Serial0/1/0 2 2
Serial0/0/0 2 2
Automatic network summarization is not in effect
Maximum path: 4
Routing for Networks:
172.29.0.0
192.29.3.0
209.17.220.0
209.168.220.0
Passive Interface(s):
GigabitEthernet0/0
Routing Information Sources:
Gateway Distance Last Update
172.29.3.2 120 00:00:12
172.29.3.6 120 00:00:12
172.29.3.10 120 00:00:20
209.17.220.5 120 00:00:20
Distance: (default is 120)

BOGOTA2#sh ip protocol
Routing Protocol is "rip"

Sending updates every 30 seconds, next due in 19 seconds
Invalid after 180 seconds, hold down 180, flushed after 240
Outgoing update filter list for all interfaces is not set
Incoming update filter list for all interfaces is not set
Redistributing: rip
Default version control: send version 2, receive 2
Interface Send Recv Triggered RIP Key-chain
Serial0/0/1 2 2
Serial0/0/0 2 2
Automatic network summarization is not in effect
Maximum path: 4
Routing for Networks:
172.29.0.0
192.29.3.0
Passive Interface(s):
GigabitEthernet0/0
Routing Information Sources:
Gateway Distance Last Update
172.29.3.14 120 00:00:28
172.29.3.9 120 00:00:20
Distance: (default is 120)

BOGOTA3#sh ip protocol
Routing Protocol is "rip"
Sending updates every 30 seconds, next due in 10 seconds
Invalid after 180 seconds, hold down 180, flushed after 240
Outgoing update filter list for all interfaces is not set
Incoming update filter list for all interfaces is not set
Redistributing: rip
Default version control: send version 2, receive 2
Interface Send Recv Triggered RIP Key-chain
GigabitEthernet0/1 2 2
Serial0/0/1 2 2
Serial0/0/0 2 2
Automatic network summarization is not in effect
Maximum path: 4
Routing for Networks:
172.29.0.0
Passive Interface(s):
GigabitEthernet0/0
Routing Information Sources:
Gateway Distance Last Update
172.29.3.13 120 00:00:00
172.29.3.5 120 00:00:14
Distance: (default is 120)

b. Verificar y documentar la base de datos de RIP de cada router, donde se informa de manera detallada de todas las rutas hacia cada red.

Medellin3

172.29.0.0/16 is variably subnetted, 14 subnets, 4 masks
R 172.29.0.0/24 [120/4] via 172.29.6.14, 00:00:15, Serial0/0/1
R 172.29.1.0/24 [120/4] via 172.29.6.14, 00:00:15, Serial0/0/1
R 172.29.3.0/30 [120/3] via 172.29.6.14, 00:00:15, Serial0/0/1
R 172.29.3.4/30 [120/3] via 172.29.6.14, 00:00:15, Serial0/0/1
R 172.29.3.8/30 [120/3] via 172.29.6.14, 00:00:15, Serial0/0/1
R 172.29.3.12/30 [120/4] via 172.29.6.14, 00:00:15, Serial0/0/1
R 172.29.4.0/25 [120/1] via 172.29.6.5, 00:00:23, Serial0/0/0
C 172.29.4.128/25 is directly connected, GigabitEthernet0/0
L 172.29.4.129/32 is directly connected, GigabitEthernet0/0
R 172.29.6.0/30 [120/1] via 172.29.6.5, 00:00:23, Serial0/0/0
[120/1] via 172.29.6.14, 00:00:15, Serial0/0/1
C 172.29.6.4/30 is directly connected, Serial0/0/0
L 172.29.6.6/32 is directly connected, Serial0/0/0
C 172.29.6.12/30 is directly connected, Serial0/0/1
L 172.29.6.13/32 is directly connected, Serial0/0/1
209.17.220.0/30 is subnetted, 2 subnets
R 209.17.220.0/30 [120/1] via 172.29.6.14, 00:00:15, Serial0/0/1
R 209.17.220.4/30 [120/2] via 172.29.6.14, 00:00:15, Serial0/0/1

Medellin2

172.29.0.0/16 is variably subnetted, 15 subnets, 4 masks
R 172.29.0.0/24 [120/4] via 172.29.6.2, 00:00:21, Serial0/0/1
R 172.29.1.0/24 [120/4] via 172.29.6.2, 00:00:21, Serial0/0/1
R 172.29.3.0/30 [120/3] via 172.29.6.2, 00:00:21, Serial0/0/1
R 172.29.3.4/30 [120/3] via 172.29.6.2, 00:00:21, Serial0/0/1
R 172.29.3.8/30 [120/3] via 172.29.6.2, 00:00:21, Serial0/0/1
R 172.29.3.12/30 [120/4] via 172.29.6.2, 00:00:21, Serial0/0/1
C 172.29.4.0/25 is directly connected, GigabitEthernet0/0
L 172.29.4.1/32 is directly connected, GigabitEthernet0/0
R 172.29.4.128/25 [120/1] via 172.29.6.6, 00:00:12, Serial0/0/0
C 172.29.6.0/30 is directly connected, Serial0/0/1
L 172.29.6.1/32 is directly connected, Serial0/0/1
C 172.29.6.4/30 is directly connected, Serial0/0/0
L 172.29.6.5/32 is directly connected, Serial0/0/0
R 172.29.6.8/30 [120/1] via 172.29.6.6, 00:00:12, Serial0/0/0
[120/1] via 172.29.6.2, 00:00:21, Serial0/0/1
R 172.29.6.12/30 [120/1] via 172.29.6.6, 00:00:12, Serial0/0/0
[120/1] via 172.29.6.2, 00:00:21, Serial0/0/1
209.17.220.0/30 is subnetted, 2 subnets
R 209.17.220.0/30 [120/1] via 172.29.6.2, 00:00:21, Serial0/0/1

R 209.17.220.4/30 [120/2] via 172.29.6.2, 00:00:21, Serial0/0/1

Medellin1

172.29.0.0/16 is variably subnetted, 13 subnets, 4 masks
R 172.29.0.0/24 [120/3] via 209.17.220.2, 00:00:10, Serial0/1/0
R 172.29.1.0/24 [120/3] via 209.17.220.2, 00:00:10, Serial0/1/0
R 172.29.3.0/30 [120/2] via 209.17.220.2, 00:00:10, Serial0/1/0
R 172.29.3.4/30 [120/2] via 209.17.220.2, 00:00:10, Serial0/1/0
R 172.29.3.8/30 [120/2] via 209.17.220.2, 00:00:10, Serial0/1/0
R 172.29.3.12/30 [120/3] via 209.17.220.2, 00:00:10, Serial0/1/0
R 172.29.4.0/25 [120/1] via 172.29.6.1, 00:00:07, Serial0/0/1
R 172.29.4.128/25 [120/1] via 172.29.6.13, 00:00:15, Serial0/0/0
C 172.29.6.0/30 is directly connected, Serial0/0/1
L 172.29.6.2/32 is directly connected, Serial0/0/1
R 172.29.6.4/30 [120/1] via 172.29.6.1, 00:00:07, Serial0/0/1
[120/1] via 172.29.6.13, 00:00:15, Serial0/0/0
C 172.29.6.12/30 is directly connected, Serial0/0/0
L 172.29.6.14/32 is directly connected, Serial0/0/0
209.17.220.0/24 is variably subnetted, 3 subnets, 2 masks
C 209.17.220.0/30 is directly connected, Serial0/1/0
L 209.17.220.1/32 is directly connected, Serial0/1/0
R 209.17.220.4/30 [120/1] via 209.17.220.2, 00:00:10, Serial0/1/0

ISP

172.29.0.0/16 is variably subnetted, 12 subnets, 3 masks
R 172.29.0.0/24 [120/2] via 209.17.220.6, 00:00:10, Serial0/0/1
R 172.29.1.0/24 [120/2] via 209.17.220.6, 00:00:10, Serial0/0/1
R 172.29.3.0/30 [120/1] via 209.17.220.6, 00:00:10, Serial0/0/1
R 172.29.3.4/30 [120/1] via 209.17.220.6, 00:00:10, Serial0/0/1
R 172.29.3.8/30 [120/1] via 209.17.220.6, 00:00:10, Serial0/0/1
R 172.29.3.12/30 [120/2] via 209.17.220.6, 00:00:10, Serial0/0/1
R 172.29.4.0/25 [120/2] via 209.17.220.1, 00:00:16, Serial0/0/0
R 172.29.4.128/25 [120/2] via 209.17.220.1, 00:00:16, Serial0/0/0
R 172.29.6.0/30 [120/1] via 209.17.220.1, 00:00:16, Serial0/0/0
R 172.29.6.4/30 [120/2] via 209.17.220.1, 00:00:16, Serial0/0/0
R 172.29.6.8/30 [120/1] via 209.17.220.1, 00:00:16, Serial0/0/0
R 172.29.6.12/30 [120/1] via 209.17.220.1, 00:00:16, Serial0/0/0
209.17.220.0/24 is variably subnetted, 4 subnets, 2 masks
C 209.17.220.0/30 is directly connected, Serial0/0/0
L 209.17.220.2/32 is directly connected, Serial0/0/0
C 209.17.220.4/30 is directly connected, Serial0/0/1
L 209.17.220.5/32 is directly connected, Serial0/0/1

Bogota1

172.29.0.0/16 is variably subnetted, 13 subnets, 4 masks

R 172.29.0.0/24 [120/1] via 172.29.3.6, 00:00:16, Serial0/1/0
R 172.29.1.0/24 [120/1] via 172.29.3.10, 00:00:07, Serial0/0/1
C 172.29.3.4/30 is directly connected, Serial0/1/0
L 172.29.3.5/32 is directly connected, Serial0/1/0
C 172.29.3.8/30 is directly connected, Serial0/0/1
L 172.29.3.9/32 is directly connected, Serial0/0/1
R 172.29.3.12/30 [120/1] via 172.29.3.6, 00:00:16, Serial0/1/0
[120/1] via 172.29.3.10, 00:00:07, Serial0/0/1
R 172.29.4.0/25 [120/3] via 209.17.220.5, 00:00:14, Serial0/0/0
R 172.29.4.128/25 [120/3] via 209.17.220.5, 00:00:14, Serial0/0/0
R 172.29.6.0/30 [120/2] via 209.17.220.5, 00:00:14, Serial0/0/0
R 172.29.6.4/30 [120/3] via 209.17.220.5, 00:00:14, Serial0/0/0
R 172.29.6.8/30 [120/2] via 209.17.220.5, 00:00:14, Serial0/0/0
R 172.29.6.12/30 [120/2] via 209.17.220.5, 00:00:14, Serial0/0/0
209.17.220.0/24 is variably subnetted, 3 subnets, 2 masks
R 209.17.220.0/30 [120/1] via 209.17.220.5, 00:00:14, Serial0/0/0
C 209.17.220.4/30 is directly connected, Serial0/0/0
L 209.17.220.6/32 is directly connected, Serial0/0/0

Bogota2

172.29.0.0/16 is variably subnetted, 15 subnets, 4 masks
R 172.29.0.0/24 [120/1] via 172.29.3.14, 00:00:01, Serial0/0/1
C 172.29.1.0/24 is directly connected, GigabitEthernet0/0
L 172.29.1.1/32 is directly connected, GigabitEthernet0/0
R 172.29.3.0/30 [120/1] via 172.29.3.9, 00:00:11, Serial0/0/0
[120/1] via 172.29.3.14, 00:00:01, Serial0/0/1
R 172.29.3.4/30 [120/1] via 172.29.3.9, 00:00:11, Serial0/0/0
[120/1] via 172.29.3.14, 00:00:01, Serial0/0/1
C 172.29.3.8/30 is directly connected, Serial0/0/0
L 172.29.3.10/32 is directly connected, Serial0/0/0
C 172.29.3.12/30 is directly connected, Serial0/0/1
L 172.29.3.13/32 is directly connected, Serial0/0/1
R 172.29.4.0/25 [120/4] via 172.29.3.9, 00:00:11, Serial0/0/0
R 172.29.4.128/25 [120/4] via 172.29.3.9, 00:00:11, Serial0/0/0
R 172.29.6.0/30 [120/3] via 172.29.3.9, 00:00:11, Serial0/0/0
R 172.29.6.4/30 [120/4] via 172.29.3.9, 00:00:11, Serial0/0/0
R 172.29.6.8/30 [120/3] via 172.29.3.9, 00:00:11, Serial0/0/0
R 172.29.6.12/30 [120/3] via 172.29.3.9, 00:00:11, Serial0/0/0
209.17.220.0/30 is subnetted, 2 subnets
R 209.17.220.0/30 [120/2] via 172.29.3.9, 00:00:11, Serial0/0/0
R 209.17.220.4/30 [120/1] via 172.29.3.9, 00:00:11, Serial0/0/0

Bogota3

172.29.0.0/16 is variably subnetted, 14 subnets, 4 masks
C 172.29.0.0/24 is directly connected, GigabitEthernet0/0
L 172.29.0.1/32 is directly connected, GigabitEthernet0/0

R 172.29.1.0/24 [120/1] via 172.29.3.13, 00:00:10, Serial0/0/1
C 172.29.3.4/30 is directly connected, Serial0/0/0
L 172.29.3.6/32 is directly connected, Serial0/0/0
R 172.29.3.8/30 [120/1] via 172.29.3.5, 00:00:27, Serial0/0/0
[120/1] via 172.29.3.13, 00:00:10, Serial0/0/1
C 172.29.3.12/30 is directly connected, Serial0/0/1
L 172.29.3.14/32 is directly connected, Serial0/0/1
R 172.29.4.0/25 [120/4] via 172.29.3.5, 00:00:27, Serial0/0/0
R 172.29.4.128/25 [120/4] via 172.29.3.5, 00:00:27, Serial0/0/0
R 172.29.6.0/30 [120/3] via 172.29.3.5, 00:00:27, Serial0/0/0
R 172.29.6.4/30 [120/4] via 172.29.3.5, 00:00:27, Serial0/0/0
R 172.29.6.8/30 [120/3] via 172.29.3.5, 00:00:27, Serial0/0/0
R 172.29.6.12/30 [120/3] via 172.29.3.5, 00:00:27, Serial0/0/0
209.17.220.0/30 is subnetted, 2 subnets
R 209.17.220.0/30 [120/2] via 172.29.3.5, 00:00:27, Serial0/0/0
R 209.17.220.4/30 [120/1] via 172.29.3.5, 00:00:27, Serial0/0/0

En resumen se puede observar que las redes identificadas con la letra R tienen una ruta vía IP a través del puerto serial configurado en el router

Parte 5: Configurar encapsulamiento y autenticación PPP.

a. Según la topología se requiere que el enlace Medellín1 con ISP sea configurado con autenticación PAT.

ISP>enable

Password:

ISP#config t
Enter configuration commands, one per line. End with CNTL/Z.
ISP(config)#username ISP password ederunad
ISP(config)#int s0/0/0
ISP(config-if)#encapsulation ppp
ISP(config-if)#
%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial0/0/0, changed state to down
ISP(config-if)#ppp authentication pap
ISP(config-if)#ppp pap sent-username A1 password A1
ISP(config-if)#end
ISP#%SYS-5-CONFIG_I: Configured from console by console

El enlace Bogotá1 con ISP se debe configurar con autenticación CHAT.

ISP#confi t
Enter configuration commands, one per line. End with CNTL/Z.
ISP(config)#username A2 password ederunad1
ISP(config)#username BOGOTA1 password ederunad1

ISP(config)#int s0/0/1
ISP(config-if)#encapsulation ppp
ISP(config-if)#
%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial0/0/1, changed state to down
ISP(config-if)#ppp authentication chap
ISP(config-if)#end

Parte 6: Configuración de PAT.

a. En la topología, si se activa NAT en cada equipo de salida (Bogotá1 y Medellín1), los routers internos de una ciudad no podrán llegar hasta los routers internos en el otro extremo, sólo existirá comunicación hasta los routers Bogotá1, ISP y Medellín1.

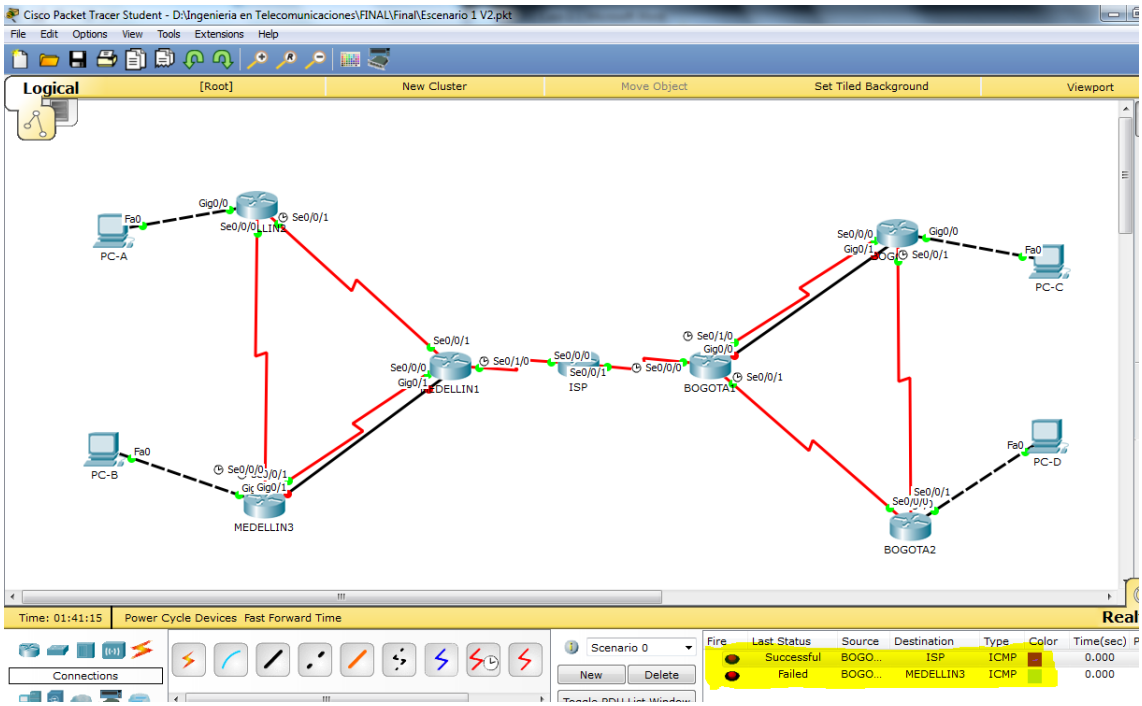


Imagen 4 – Falla de comunicación entre dispositivos de otra red

Configuración PAT router MEDELLIN1

MEDELLIN1>enable
Password:
MEDELLIN1#config t
Enter configuration commands, one per line. End with CNTL/Z.
MEDELLIN1(config)#int s0/0/0
MEDELLIN1(config-if)#ip nat inside
MEDELLIN1(config-if)#int s0/0/1
MEDELLIN1(config-if)#ip nat inside
MEDELLIN1(config-if)#int s0/1/0
MEDELLIN1(config-if)#ip nat outside

MEDELLIN1(config-if)#exit
MEDELLIN1(config)#ip nat inside source list address interface s0/1/0 overload
MEDELLIN1(config)#ip access-list standar aclnat
MEDELLIN1(config-std-nacl)#permit 172.29.6.0 0.0.0.252
MEDELLIN1(config-std-nacl)#exit
MEDELLIN1(config)#exit
MEDELLIN1#
%SYS-5-CONFIG_I: Configured from console by console
Configuración PAT router BOGOTA1

BOGOTA1>enable
Password:
BOGOTA1#confi t
Enter configuration commands, one per line. End with CNTL/Z.
BOGOTA1(config)#int s0/1/0
BOGOTA1(config-if)#ip nat inside
BOGOTA1(config-if)#int s0/0/1
BOGOTA1(config-if)#ip nat inside
BOGOTA1(config-if)#int s0/0/0
BOGOTA1(config-if)#ip nat outside
BOGOTA1(config-if)#exit
BOGOTA1(config)#ip nat inside source list address interface s0/0/0 overload
BOGOTA1(config)#ip access-list standar aclnat
BOGOTA1(config-std-nacl)#permit 172.29.3.0 0.0.0.252
BOGOTA1(config-std-nacl)#exit
BOGOTA1(config)#exit

b. Después de verificar lo indicado en el paso anterior proceda a configurar el NAT en el router Medellín1. Compruebe que la traducción de direcciones indique las interfaces de entrada y de salida. Al realizar una prueba de ping, la dirección debe ser traducida automáticamente a la dirección de la interfaz serial 0/1/0 del router Medellín1, cómo diferente puerto.

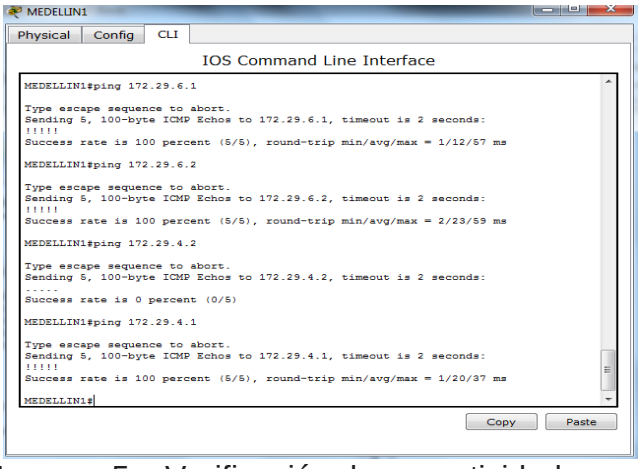


Imagen 5 – Verificación de conectividad

c. Proceda a configurar el NAT en el router Bogotá1. Compruebe que la traducción de direcciones indique las interfaces de entrada y de salida. Al realizar una prueba de ping, la dirección debe ser traducida automáticamente a la dirección de la interfaz serial 0/1/0 del router Bogotá1, cómo diferente puerto.

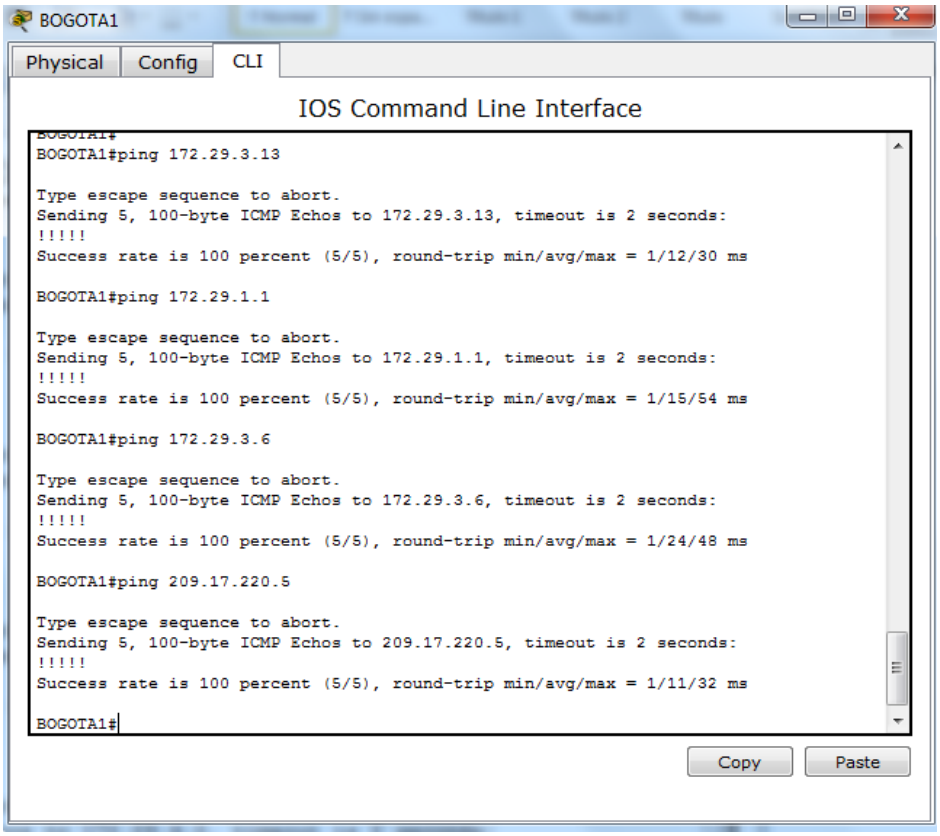


Imagen 6 – Verificación de conectividad

Parte 7: Configuración del servicio DHCP.

a. Configurar la red Medellín2 y Medellín3 donde el router Medellín 2 debe ser el servidor DHCP para ambas redes Lan.

MEDELLIN2#confi t
MEDELLIN2(config)#ip dhcp pool DHCPMEDELLIN1
MEDELLIN2(dhcp-config)#network 172.29.4.0 255.255.255.128
MEDELLIN2(dhcp-config)#default-router 172.29.4.1
MEDELLIN2(dhcp-config)#dns-server 8.8.8.8
MEDELLIN2(dhcp-config)#exit
MEDELLIN2(config)#

b. El router Medellín3 deberá habilitar el paso de los mensajes broadcast hacia la IP del router Medellín2.

c. Configurar la red Bogotá2 y Bogotá3 donde el router Bogota2 debe ser el servidor DHCP para ambas redes Lan.

BOGOTA2#conf t
Enter configuration commands, one per line. End with CNTL/Z.
BOGOTA2(config)#ip dhcp pool DHCPBOGOTA
BOGOTA2(dhcp-config)#network 172.29.1.0 255.255.255.252
BOGOTA2(dhcp-config)#default-router 172.29.1.1
BOGOTA2(dhcp-config)#dns-server 8.8.8.8
BOGOTA2(dhcp-config)#exit
BOGOTA2(config)#exit
BOGOTA2#
%SYS-5-CONFIG_I: Configured from console by console

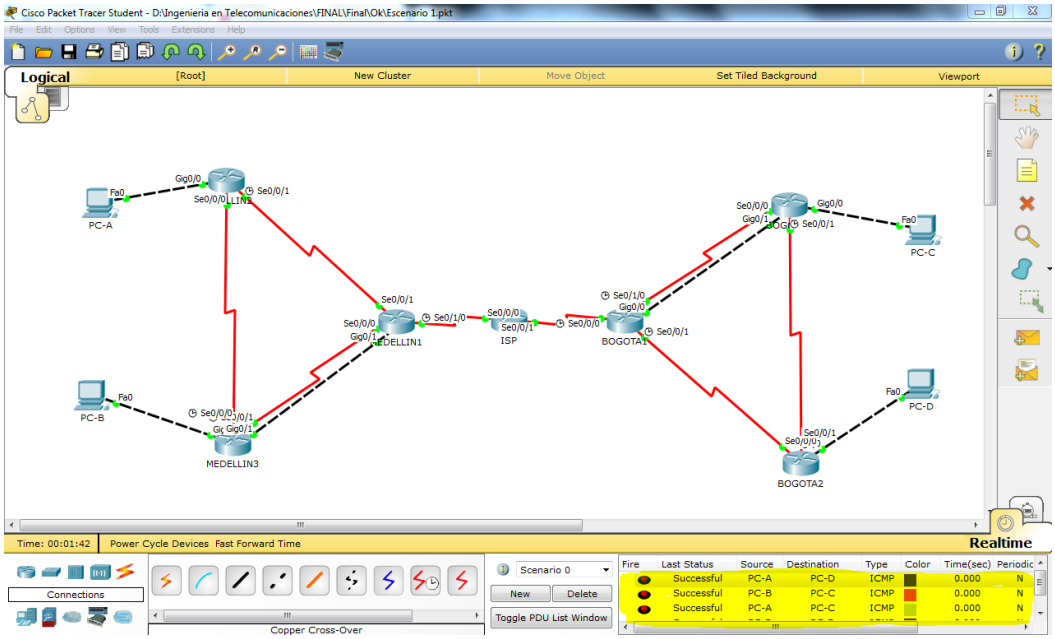
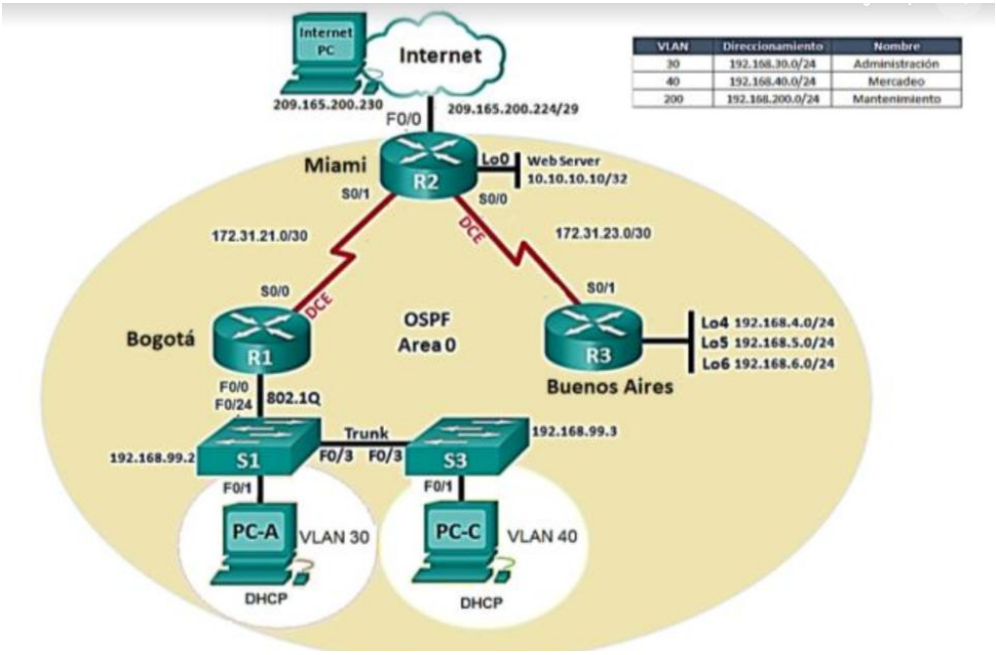


Imagen 7 – Pruebas de conectividad entre host

ESCENARIO DOS

Escenario: Una empresa de Tecnología posee tres sucursales distribuidas en las ciudades de Miami, Bogotá y Buenos Aires, en donde el estudiante será el administrador de la red, el cual deberá configurar e interconectar entre sí cada uno de los dispositivos que forman parte del escenario, acorde con los lineamientos establecidos para el direccionamiento IP, protocolos de enrutamiento y demás aspectos que forman parte de la topología de red.



VLAN	Direccionamiento	Nombre
30	192.168.30.0/24	Administración
40	192.168.40.0/24	Mercadeo
200	192.168.200.0/24	Mantenimiento

Imagen 8 – Topología de red

Configurar el direccionamiento IP acorde con la topología de red para cada uno de los dispositivos que forman parte del escenario

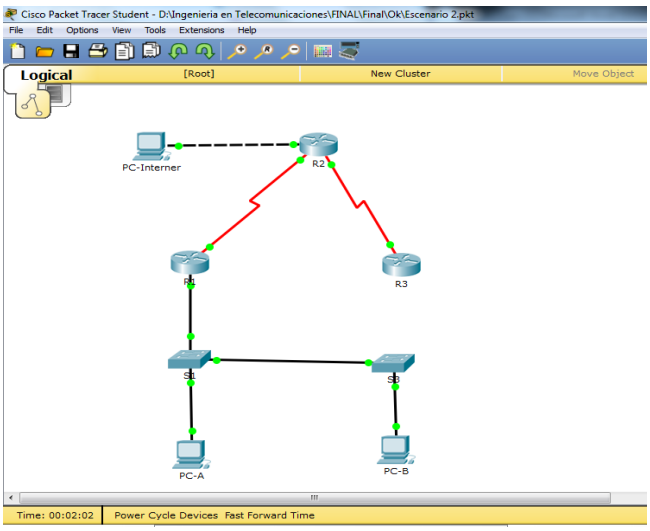


Imagen 9 – Topología de red

Rutinas de diagnóstico y configuración

Router Miami

Router>enable
Router#conf t
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#hostname Miami
Miami(config)#enable password ederunad
Miami(config)#line vty 0 15
Miami(config-line)#password ederunad1
Miami(config-line)#login
Miami(config-line)#exit
Miami(config)#line console 0
Miami(config-line)#password ederunad1
Miami(config-line)#login
Miami(config-line)#logging synchronous
Miami(config-line)#exit
Miami(config)#int s0/0/0
Miami(config-if)# ip address 172.31.23.1 255.255.255.252
Miami(config-if)#clock rate 128000
Miami(config-if)#no shutdown
%LINK-5-CHANGED: Interface Serial0/0/0, changed state to down
Miami(config-if)#exit
Miami(config)#int s0/0/1
Miami(config-if)# ip address 172.31.21.2 255.255.255.252
Miami(config-if)#no shutdown
%LINK-5-CHANGED: Interface Serial0/0/1, changed state to down
Miami(config-if)#exit
Miami(config-if)#
%LINK-5-CHANGED: Interface GigabitEthernet0/0, changed state to up
Miami(config-if)#exit
Miami(config)#exit
Miami#
%SYS-5-CONFIG_I: Configured from console by console
Miami(config)#int loopback 0
Miami(config-if)#
%LINK-5-CHANGED: Interface Loopback0, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface Loopback0, changed state to up
Miami(config-if)#ip address 10.10.10.10 255.255.255.255
Miami(config-if)#exit
Miami(config)#end
Miami#
%SYS-5-CONFIG_I: Configured from console by console

Router Buenos Aires

Router>enable
Router#config t
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#hostname BuenosAires
BuenosAires(config)#enable password ederunad
BuenosAires(config)#line vty 0 15
BuenosAires(config-line)#password ederunad1
BuenosAires(config-line)#login
BuenosAires(config-line)#exit
BuenosAires(config)#line console 0
BuenosAires(config-line)#password ederunad1
BuenosAires(config-line)#login
BuenosAires(config-line)#logging synchronous
BuenosAires(config-line)#exit
BuenosAires(config)#int s0/0/1
BuenosAires(config-if)#ip address 172.31.23.2 255.255.255.252
BuenosAires(config-if)#clock rate 128000
This command applies only to DCE interfaces
BuenosAires(config-if)#no shutdown
BuenosAires(config-if)#
%LINK-5-CHANGED: Interface Serial0/0/1, changed state to up
BuenosAires(config-if)#exit
BuenosAires(config)#
%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial0/0/1, changed state to upi
BuenosAires(config)#int loopback 4
BuenosAires(config-if)#
%LINK-5-CHANGED: Interface Loopback4, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface Loopback4, changed state to up
BuenosAires(config-if)#ip address 192.168.4.2 255.255.255.0
BuenosAires(config-if)#exit
BuenosAires(config)#int loopback 5
BuenosAires(config-if)#
%LINK-5-CHANGED: Interface Loopback5, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface Loopback5, changed state to up
BuenosAires(config-if)#ip address 192.168.5.2 255.255.255.0
BuenosAires(config-if)#exit
BuenosAires(config)#int loopback 6
BuenosAires(config-if)#
%LINK-5-CHANGED: Interface Loopback6, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface Loopback6, changed state to up
BuenosAires(config-if)#ip address 192.168.6.2 255.255.255.0
BuenosAires(config-if)#end

BuenosAires#
%SYS-5-CONFIG_I: Configured from console by console

Router Bogota

Router>enable
Router#conf t
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#hostname Bogota
Bogota(config)#enable password ederunad
Bogota(config)#line vty 0 15
Bogota(config-line)#password ederunad1
Bogota(config-line)#login
Bogota(config-line)#exit
Bogota(config)#line console 0
Bogota(config-line)#password ederunad1
Bogota(config-line)#login
Bogota(config-line)#logging synchronous
Bogota(config-line)#exit
Bogota(config)#int s0/0/0
Bogota(config-if)# ip address 172.31.21.1 255.255.255.252
Bogota(config-if)#clock rate 128000
Bogota(config-if)#no shutdown
Bogota(config-if)#
%LINK-5-CHANGED: Interface Serial0/0/0, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial0/0/0, changed state to up
Bogota(config-if)#exit

Switch S1

Switch>enable
Switch#conf t
Enter configuration commands, one per line. End with CNTL/Z.
Switch(config)#hostname S1
S1(config)#line console 0
S1(config-line)#password ederunad1
S1(config-line)#login
S1(config-line)#exit
S1(config)#banner motd "Prohibido el acceso a personal no autorizado"
S1(config)#exit

Switch S1

Switch#confi t
Enter configuration commands, one per line. End with CNTL/Z.
S1(config)#hostname S3
S2(config)#exit

S2#
%SYS-5-CONFIG_I: Configured from console by console
S2#confi t
Enter configuration commands, one per line. End with CNTL/Z.
S2(config)#line console 0
S2(config-line)#password ederunad1
S2(config-line)#login
S2(config-line)#exit
S2(config)#banner motd "Prohibido el acceso a personal no autorizado"
S2(config)#exit
S2#
%SYS-5-CONFIG_I: Configured from console by console

Parte 1: Configurar el protocolo de enrutamiento OSPFv2 bajo los siguientes criterios:

OSPFv2 area 0

Tabla 2. Configuración protocolo OSPF

Configuration Item or Task	Specification
Router ID R1	1.1.1.1
Router ID R2	5.5.5.5
Router ID R3	8.8.8.8
Configurar todas las interfaces LAN como pasivas	
Establecer el ancho de banda para enlaces seriales en	256 Kb/s
Ajustar el costo en la métrica de S0/0 a	9500

Configuración OSPF Router Bogotá

Bogota#conf
Configuring from terminal, memory, or network [terminal]? t
Enter configuration commands, one per line. End with CNTL/Z.
Bogota(config)#router ospf 1
Bogota(config-router)#network 172.31.21.0 0.0.0.3 area 0
Bogota(config-router)#network 192.168.30.0 0.0.0.255 area 0
Bogota(config-router)#network 192.168.40.0 0.0.0.255 area 0
Bogota(config-router)#network 192.168.200.0 0.0.0.255 area 0
Bogota(config-router)#passive-interface g0/0.30
Bogota(config-router)#passive-interface g0/0.40
Bogota(config-router)#passive-interface g0/0.200

Bogota(config-router)#router-id 1.1.1.1
Bogota(config-router)# Reload or use "clear ip ospf process" command, for this to take effect
Bogota(config-router)# passive-interface g0/0
Bogota(config-router)#end
Bogota#
%SYS-5-CONFIG_I: Configured from console by console
Bogota#
00:17:33: %OSPF-5-ADJCHG: Process 1, Nbr 10.10.10.10 on Serial0/0/0 from LOADING to FULL, Loading Done
Bogota#confi t
Enter configuration commands, one per line. End with CNTL/Z.
Bogota(config)#int s0/0/0
Bogota(config-if)#bandwidth 256
Bogota(config-if)#ip ospf cost 9500
Bogota(config-if)#end

Configuración OSPF Router Miami

Miami#conf t
Enter configuration commands, one per line. End with CNTL/Z.
Miami(config)#router ospf 1
Miami(config)#router ospf 1
Miami(config-router)#network 172.31.21.0 0.0.0.3 area 0
Miami(config-router)#network 172.31.23.0 0.0.0.3 area 0
Miami(config-router)#network 10.10.10.0 0.0.0.255 area 0
Miami(config-router)#passive-interface G0/1
Miami(config-router)#exit
Miami(config)#exit
Miami(config-router)#router-id 5.5.5.5
Miami(config-router)#Reload or use "clear ip ospf process" command, for this to take effect
Miami(config-router)#passive-interface g0/0
Miami(config-router)#end
Miami#conf t
Enter configuration commands, one per line. End with CNTL/Z.
Miami(config)#int s 0/0/0
Miami(config-if)#bandwidth 256
Miami(config-if)#ip ospf cost 9500
Miami(config-if)#end
Miami(config)#int s0/0/1
Miami(config-if)#bandwidth 256
Miami(config-if)#ip ospf cost 9500
Miami(config-if)#end

Configuración OSPF Router Buenos Aires

BuenosAires>enable
Password:
BuenosAires#conf t
Enter configuration commands, one per line. End with CNTL/Z.
BuenosAires(config)#router ospf 1
BuenosAires(config)#network 172.31.23.0 0.0.0.255 area 0
BuenosAires(config-router)#router-id 8.8.8.8
BuenosAires(config-router)#passive-interface G0/0
BuenosAires(config-router)#end
BuenosAires#
%SYS-5-CONFIG_I: Configured from console by console
BuenosAires(config)#int s0/0/1
BuenosAires(config-if)#bandwidth 256
BuenosAires(config-if)#ip ospf cost 9500
BuenosAires(config-if)#end
BuenosAires#

Parte 2: Verificar información de OSPF

Visualizar tablas de enrutamiento y routers conectados por OSPFv2

Bogota>enable
Password:
Bogota#sh ip route ospf 1
10.0.0.0/32 is subnetted, 1 subnets
O 10.10.10.10 [110/9501] via 172.31.21.2, 00:00:10, Serial0/0/0
172.31.0.0/16 is variably subnetted, 3 subnets, 2 masks
O 172.31.23.0 [110/19000] via 172.31.21.2, 00:00:10, Serial0/0/0
192.168.4.0/32 is subnetted, 1 subnets
O 192.168.4.1 [110/19001] via 172.31.21.2, 00:00:10, Serial0/0/0

Miami>enable
Password:
Miami#sh ip route ospf 1
192.168.4.0/32 is subnetted, 1 subnets
O 192.168.4.1 [110/9501] via 172.31.23.2, 00:01:45, Serial0/0/0
O 192.168.30.0 [110/9501] via 172.31.21.1, 00:01:45, Serial0/0/1
O 192.168.40.0 [110/9501] via 172.31.21.1, 00:01:45, Serial0/0/1
O 192.168.200.0 [110/9501] via 172.31.21.1, 00:01:45, Serial0/0/1

BuenosAires>enable
Password:
BuenosAires#sho ip route ospf 1
10.0.0.0/32 is subnetted, 1 subnets
O 10.10.10.10 [110/65] via 172.31.23.1, 00:02:31, Serial0/0/1
172.31.0.0/16 is variably subnetted, 3 subnets, 2 masks

O 172.31.21.0 [110/9564] via 172.31.23.1, 00:02:31, Serial0/0/1
O 192.168.30.0 [110/9565] via 172.31.23.1, 00:02:21, Serial0/0/1
O 192.168.40.0 [110/9565] via 172.31.23.1, 00:02:21, Serial0/0/1
O 192.168.200.0 [110/9565] via 172.31.23.1, 00:02:21, Serial0/0/1

Visualizar lista resumida de interfaces por OSPF en donde se ilustre el costo de cada interface

Bogota#sh ip ospf interface

GigabitEthernet0/0.30 is up, line protocol is up
Internet address is 192.168.30.1/24, Area 0
Process ID 1, Router ID 192.168.200.1, Network Type BROADCAST, Cost: 1
Transmit Delay is 1 sec, State DR, Priority 1
Designated Router (ID) 192.168.200.1, Interface address 192.168.30.1
No backup designated router on this network
Timer intervals configured, Hello 10, Dead 40, Wait 40, Retransmit 5
No Hellos (Passive interface)
Index 1/1, flood queue length 0
Next 0x0(0)/0x0(0)
Last flood scan length is 1, maximum is 1
Last flood scan time is 0 msec, maximum is 0 msec
Neighbor Count is 0, Adjacent neighbor count is 0
Suppress hello for 0 neighbor(s)
GigabitEthernet0/0.40 is up, line protocol is up
Internet address is 192.168.40.1/24, Area 0
Process ID 1, Router ID 192.168.200.1, Network Type BROADCAST, Cost: 1
Transmit Delay is 1 sec, State DR, Priority 1
Designated Router (ID) 192.168.200.1, Interface address 192.168.40.1
No backup designated router on this network
Timer intervals configured, Hello 10, Dead 40, Wait 40, Retransmit 5
No Hellos (Passive interface)
Index 2/2, flood queue length 0
Next 0x0(0)/0x0(0)
Last flood scan length is 1, maximum is 1
Last flood scan time is 0 msec, maximum is 0 msec
Neighbor Count is 0, Adjacent neighbor count is 0
Suppress hello for 0 neighbor(s)
GigabitEthernet0/0.200 is up, line protocol is up
Internet address is 192.168.200.1/24, Area 0
Process ID 1, Router ID 192.168.200.1, Network Type BROADCAST, Cost: 1
Transmit Delay is 1 sec, State DR, Priority 1
Designated Router (ID) 192.168.200.1, Interface address 192.168.200.1
No backup designated router on this network
Timer intervals configured, Hello 10, Dead 40, Wait 40, Retransmit 5
No Hellos (Passive interface)
Index 3/3, flood queue length 0
Next 0x0(0)/0x0(0)

Last flood scan length is 1, maximum is 1
Last flood scan time is 0 msec, maximum is 0 msec
Neighbor Count is 0, Adjacent neighbor count is 0
Suppress hello for 0 neighbor(s)
Serial0/0/0 is up, line protocol is up
Internet address is 172.31.21.1/30, Area 0
Process ID 1, Router ID 192.168.200.1, Network Type POINT-TO-POINT, Cost: 9500
Transmit Delay is 1 sec, State POINT-TO-POINT, Priority 0
No designated router on this network
No backup designated router on this network
Timer intervals configured, Hello 10, Dead 40, Wait 40, Retransmit 5
Hello due in 00:00:07
Index 4/4, flood queue length 0
Next 0x0(0)/0x0(0)
Last flood scan length is 1, maximum is 1
Last flood scan time is 0 msec, maximum is 0 msec
Neighbor Count is 1 , Adjacent neighbor count is 1
Adjacent with neighbor 10.10.10.10
Suppress hello for 0 neighbor(s)

Miami#sh ip ospf interface

Loopback0 is up, line protocol is up
Internet address is 10.10.10.10/32, Area 0
Process ID 1, Router ID 10.10.10.10, Network Type LOOPBACK, Cost: 1
Loopback interface is treated as a stub Host
Serial0/0/0 is up, line protocol is up
Internet address is 172.31.23.1/30, Area 0
Process ID 1, Router ID 10.10.10.10, Network Type POINT-TO-POINT, Cost: 9500
Transmit Delay is 1 sec, State POINT-TO-POINT, Priority 0
No designated router on this network
No backup designated router on this network
Timer intervals configured, Hello 10, Dead 40, Wait 40, Retransmit 5
Hello due in 00:00:07
Index 2/2, flood queue length 0
Next 0x0(0)/0x0(0)
Last flood scan length is 1, maximum is 1
Last flood scan time is 0 msec, maximum is 0 msec
Neighbor Count is 1 , Adjacent neighbor count is 1
Adjacent with neighbor 8.8.8.8
Suppress hello for 0 neighbor(s)
Serial0/0/1 is up, line protocol is up
Internet address is 172.31.21.2/30, Area 0
Process ID 1, Router ID 10.10.10.10, Network Type POINT-TO-POINT, Cost: 9500
Transmit Delay is 1 sec, State POINT-TO-POINT, Priority 0

No designated router on this network
No backup designated router on this network
Timer intervals configured, Hello 10, Dead 40, Wait 40, Retransmit 5
Hello due in 00:00:06
Index 3/3, flood queue length 0
Next 0x0(0)/0x0(0)
Last flood scan length is 1, maximum is 1
Last flood scan time is 0 msec, maximum is 0 msec
Neighbor Count is 1 , Adjacent neighbor count is 1
Adjacent with neighbor 192.168.200.1
Suppress hello for 0 neighbor(s)

BuenosAires#sho ip ospf interface

Loopback4 is up, line protocol is up
Internet address is 192.168.4.1/24, Area 0
Process ID 1, Router ID 8.8.8.8, Network Type LOOPBACK, Cost: 1
Loopback interface is treated as a stub Host
Serial0/0/1 is up, line protocol is up
Internet address is 172.31.23.2/30, Area 0
Process ID 1, Router ID 8.8.8.8, Network Type POINT-TO-POINT, Cost: 64
Transmit Delay is 1 sec, State POINT-TO-POINT, Priority 0
No designated router on this network
No backup designated router on this network
Timer intervals configured, Hello 10, Dead 40, Wait 40, Retransmit 5
Hello due in 00:00:07
Index 2/2, flood queue length 0
Next 0x0(0)/0x0(0)
Last flood scan length is 1, maximum is 1
Last flood scan time is 0 msec, maximum is 0 msec
Neighbor Count is 1 , Adjacent neighbor count is 1
Adjacent with neighbor 10.10.10.10
Suppress hello for 0 neighbor(s)

Visualizar el OSPF Process ID, Router ID, Address summarizations, Routing Networks, and passive interfaces configuradas en cada router.

Routing Protocol is "ospf 1"
Outgoing update filter list for all interfaces is not set
Incoming update filter list for all interfaces is not set
Router ID 1.1.1.1
Number of areas in this router is 1. 1 normal 0 stub 0 nssa
Maximum path: 4
Routing for Networks:
172.31.21.0 0.0.0.3 area 0
192.168.99.0 0.0.0.255 area 0
192.168.30.0 0.0.0.255 area 0
192.168.40.0 0.0.0.255 area 0

192.168.200.0 0.0.0.255 area 0
Passive Interface(s):
GigabitEthernet0/0.30
GigabitEthernet0/0.40
GigabitEthernet0/0.200
Routing Information Sources:
Gateway Distance Last Update
8.8.8.8 110 00:06:03
10.10.10.10 110 00:06:03
192.168.200.1 110 00:06:03
Distance: (default is 110)

Miami#sh ip protocol

Routing Protocol is "ospf 1"
Outgoing update filter list for all interfaces is not set
Incoming update filter list for all interfaces is not set
Router ID 5.5.5.5
Number of areas in this router is 1. 1 normal 0 stub 0 nssa
Maximum path: 4
Routing for Networks:
172.31.21.0 0.0.0.255 area 0
172.31.23.0 0.0.0.255 area 0
172.31.21.0 0.0.0.3 area 0
172.31.23.0 0.0.0.3 area 0
10.10.10.0 0.0.0.255 area 0
Passive Interface(s):
GigabitEthernet0/0
GigabitEthernet0/1
Routing Information Sources:
Gateway Distance Last Update
8.8.8.8 110 00:07:31
10.10.10.10 110 00:07:31
192.168.200.1 110 00:07:31
Distance: (default is 110)

BuenosAires#sh ip protocol
Routing Protocol is "rip"
Sending updates every 30 seconds, next due in 15 seconds
Invalid after 180 seconds, hold down 180, flushed after 240
Outgoing update filter list for all interfaces is not set
Incoming update filter list for all interfaces is not set
Redistributing: rip
Default version control: send version 2, receive 2
Interface Send Recv Triggered RIP Key-chain
Loopback4 2 2
Loopback5 2 2
Serial0/0/1 2 2

Automatic network summarization is in effect
Maximum path: 4
Routing for Networks:
172.31.0.0
192.168.4.0
192.168.5.0
Passive Interface(s):
Routing Information Sources:
Gateway Distance Last Update
Distance: (default is 120)

Routing Protocol is "ospf 1"
Outgoing update filter list for all interfaces is not set
Incoming update filter list for all interfaces is not set
Router ID 8.8.8.8
Number of areas in this router is 1. 1 normal 0 stub 0 nssa
Maximum path: 4
Routing for Networks:
172.31.23.0 0.0.0.3 area 0
192.168.4.0 0.0.0.255 area 0
Passive Interface(s):
Loopback4
Loopback5
Loopback6
Routing Information Sources:
Gateway Distance Last Update
8.8.8.8 110 00:09:12
10.10.10.10 110 00:09:12
192.168.200.1 110 00:09:12
Distance: (default is 110

Parte 3: Configurar VLANs, Puertos troncales, puertos de acceso, encapsulamiento, Inter-VLAN Routing y Seguridad en los Switches acorde a la topología de red establecida.

Parte 4: En el Switch 3 deshabilitar DNS lookup

S3(config)#no ip domain-lookup

Parte 5: Asignar direcciones IP a los Switches acorde a los lineamientos.

Configuración Switch S1

S1>enable
S1#conf t
Enter configuration commands, one per line. End with CNTL/Z.
S1(config)#interface Vlan 99
S1(config-if)#ip address 192.168.99.2 255.255.255.0

S1(config-if)#no shut down
S1(config-if)#exit
S1(config)#ip default-gateway 192.168.99.1
S1(config)#vlan 30
S1(config-vlan)#name Administracion
S1(config-vlan)#vlan 40
S1(config-vlan)#name Mercadeo
S1(config-vlan)#vlan 200
S1(config-vlan)#name Mantenimiento
S1(config-vlan)#end
S1#conf t
Enter configuration commands, one per line. End with CNTL/Z.
S1(config)#int g0/1
S1(config-if)#switchport mode trunk
S1(config-if)#int g0/3
%Invalid interface type and number
S1(config)#int g0/2
S1(config-if)#switchport mode trunk
S1(config-if)#
S1(config)#int fa0/1
S1(config-if)#switchport mode acces
S1(config-if)#switchport mode acces vlan 30

Configuración Switch S3

S3(config)#interface vlan 99
S3(config-if)#ip address 192.168.99.3 255.255.255.0
S3(config-if)#no shutdown
S3(config-if)#exit
S3(config)#ip default-gateway 192.168.99.1
S3(config)#vlan 30
S3(config-vlan)#name Administracion
S3(config-vlan)#vlan 40
S3(config-vlan)#name Mercadeo
S3(config-vlan)#vlan 200
S3(config-vlan)#name Mantenimiento
S3(config-vlan)#exit
S3#conf t
Enter configuration commands, one per line. End with CNTL/Z.
S3(config)#int g0/2
S3(config-if)#switchport mode trunk
S3(config-if)#
S3(config-if)#int fa0/1
S3(config-if)#switchport mode access
S3(config-if)#switchport access vlan 40
S3(config-if)#exit
S3(config)#exit

Parte 6: Desactivar todas las interfaces que no sean utilizadas en el esquema de red.

Interface Switch S1

S1#confi t
Enter configuration commands, one per line. End with CNTL/Z.
S1(config)#int f0/2
S1(config-if)#shutdown
%LINK-5-CHANGED: Interface FastEthernet0/2, changed state to administratively down
S1(config-if)#exit
S1(config)#int range f0/4 -23
S1(config-if-range)#shutdown
%LINK-5-CHANGED: Interface FastEthernet0/4, changed state to administratively down

%LINK-5-CHANGED: Interface FastEthernet0/5, changed state to administratively down

%LINK-5-CHANGED: Interface FastEthernet0/6, changed state to administratively down

%LINK-5-CHANGED: Interface FastEthernet0/7, changed state to administratively down

%LINK-5-CHANGED: Interface FastEthernet0/8, changed state to administratively down

%LINK-5-CHANGED: Interface FastEthernet0/9, changed state to administratively down

%LINK-5-CHANGED: Interface FastEthernet0/10, changed state to administratively down

%LINK-5-CHANGED: Interface FastEthernet0/11, changed state to administratively down

%LINK-5-CHANGED: Interface FastEthernet0/12, changed state to administratively down

%LINK-5-CHANGED: Interface FastEthernet0/13, changed state to administratively down

%LINK-5-CHANGED: Interface FastEthernet0/14, changed state to administratively down

%LINK-5-CHANGED: Interface FastEthernet0/15, changed state to administratively down

%LINK-5-CHANGED: Interface FastEthernet0/16, changed state to administratively down

%LINK-5-CHANGED: Interface FastEthernet0/17, changed state to administratively down

%LINK-5-CHANGED: Interface FastEthernet0/18, changed state to administratively down

%LINK-5-CHANGED: Interface FastEthernet0/19, changed state to administratively down

%LINK-5-CHANGED: Interface FastEthernet0/20, changed state to administratively down

%LINK-5-CHANGED: Interface FastEthernet0/21, changed state to administratively down

%LINK-5-CHANGED: Interface FastEthernet0/22, changed state to administratively down

%LINK-5-CHANGED: Interface FastEthernet0/23, changed state to administratively down
S1(config-if-range)#

Interface Switch S3

S3#conf t
Enter configuration commands, one per line. End with CNTL/Z.
S3(config)#int f0/2
S3(config-if)#shutdown

%LINK-5-CHANGED: Interface FastEthernet0/2, changed state to administratively down
S3(config-if)#exit
S3(config)#int range f0/4 -23
S3(config-if-range)#shutdown

%LINK-5-CHANGED: Interface FastEthernet0/4, changed state to administratively down

%LINK-5-CHANGED: Interface FastEthernet0/5, changed state to administratively down

%LINK-5-CHANGED: Interface FastEthernet0/6, changed state to administratively down

%LINK-5-CHANGED: Interface FastEthernet0/7, changed state to administratively down

%LINK-5-CHANGED: Interface FastEthernet0/8, changed state to administratively down

%LINK-5-CHANGED: Interface FastEthernet0/9, changed state to administratively down

%LINK-5-CHANGED: Interface FastEthernet0/10, changed state to administratively down

%LINK-5-CHANGED: Interface FastEthernet0/11, changed state to administratively down

%LINK-5-CHANGED: Interface FastEthernet0/12, changed state to administratively down

%LINK-5-CHANGED: Interface FastEthernet0/13, changed state to administratively down

%LINK-5-CHANGED: Interface FastEthernet0/14, changed state to administratively down

%LINK-5-CHANGED: Interface FastEthernet0/15, changed state to administratively down

%LINK-5-CHANGED: Interface FastEthernet0/16, changed state to administratively down

%LINK-5-CHANGED: Interface FastEthernet0/17, changed state to administratively down

%LINK-5-CHANGED: Interface FastEthernet0/18, changed state to administratively down

%LINK-5-CHANGED: Interface FastEthernet0/19, changed state to administratively down

%LINK-5-CHANGED: Interface FastEthernet0/20, changed state to administratively down

%LINK-5-CHANGED: Interface FastEthernet0/21, changed state to administratively down

%LINK-5-CHANGED: Interface FastEthernet0/22, changed state to administratively down

%LINK-5-CHANGED: Interface FastEthernet0/23, changed state to administratively down

Parte 7: Implement DHCP and NAT for IPv4

Miami>enable
Password:
Miami#conf t
Enter configuration commands, one per line. End with CNTL/Z.
Miami(config)#ip http server
^
% Invalid input detected at '^' marker.
Miami(config)#ip http authentication local
^
% Invalid input detected at '^' marker.
Miami(config)#ip nat inside source static 10.10.10.10 209.165.200.229
Miami(config)#int g0/0
Miami(config-if)#ip nat outside
Miami(config-if)#int g0/1
Miami(config-if)#ip nat inside
Miami(config-if)#exit
Miami(config)#end
Miami#
%SYS-5-CONFIG_I: Configured from console by console

Configurar R1 como servidor DHCP para las VLANs 30 y 40.

Bogota#conf t
Enter configuration commands, one per line. End with CNTL/Z.
Bogota(config)#ip dhcp excluded-address 192.168.30.1 192.168.30.30
Bogota(config)#ip dhcp excluded-address 192.168.40.1 192.168.40.30
Bogota(config)#

Reservar las primeras 30 direcciones IP de las VLAN 30 y 40 para configuraciones estáticas.

Tabla 3. Tabla configuración DHCP

Configurar DHCP pool para VLAN 30	Name: ADMINISTRACION DNS-Server: 10.10.10.11 Domain-Name: ccna-unad.com Establecer default gateway.
Configurar DHCP pool para VLAN 40	Name: MERCADEO DNS-Server: 10.10.10.11 Domain-Name: ccna-unad.com Establecer default gateway.

Configuración DHCP Router Bogotá

Bogota>enable
Password:
Bogota#conf t
Enter configuration commands, one per line. End with CNTL/Z.
Bogota(config)#ip dhcp pool Administracion
Bogota(dhcp-config)#dns-server 10.10.10.11
Bogota(dhcp-config)#domain-name ccna-unad.com
^
% Invalid input detected at '^' marker.
Bogota(dhcp-config)#default-router 192.168.30.1
Bogota(dhcp-config)#network 192.168.30.0 255.255.255.0
Bogota(dhcp-config)#ip dhcp pool Mercadeo
Bogota(dhcp-config)#dns-server 10.10.10.11
Bogota(dhcp-config)#domain-name ccna-unad.com
^
% Invalid input detected at '^' marker.
Bogota(dhcp-config)#default-router 192.168.40.1
Bogota(dhcp-config)#network 192.168.40.0 255.255.255.0
Bogota(dhcp-config)#exit
Bogota(config)#exit
Bogota#
%SYS-5-CONFIG_I: Configured from console by console
Configurar NAT en R2 para permitir que los host puedan salir a internet

Miami#conf t
Enter configuration commands, one per line. End with CNTL/Z.
Miami(config)#ip access-list standard 1
Miami(config-std-nacl)#permit 172.31.0.0 0.0.0.3
Miami(config-std-nacl)#exit
Miami(config)#int s0/0/1
Miami(config-if)#ip nat inside
Miami(config-if)#int g0/0
Miami(config-if)#ip nat outside
Miami(config-if)#ip nat inside source list 1 pool internet
Miami(config)#ip nat pool internet 209.165.200.226 209.165.200.229 netmask 255.255.255.248
Miami(config)#end
Miami#
%SYS-5-CONFIG_I: Configured from console by console

Configurar al menos dos listas de acceso de tipo estándar a su criterio en para restringir o permitir tráfico desde R1 o R3 hacia R2

BuenosAires>enable
Password:
BuenosAires#conf t
Enter configuration commands, one per line. End with CNTL/Z.
BuenosAires(config)#router rip
BuenosAires(config-router)#version 2
BuenosAires(config-router)#do sh ip route connec
C 172.31.23.0/30 is directly connected, Serial0/0/1
C 192.168.4.0/24 is directly connected, Loopback4
C 192.168.5.0/24 is directly connected, Loopback5
C 192.168.6.0/24 is directly connected, Loopback6
BuenosAires(config-router)#network 172.31.23.0
BuenosAires(config-router)#network 192.168.4.0
BuenosAires(config-router)#network 192.168.5.0
BuenosAires(config-router)#exit
BuenosAires(config)#exit

Verificar procesos de comunicación y redireccionamiento de tráfico en los routers mediante el uso de Ping y Traceroute

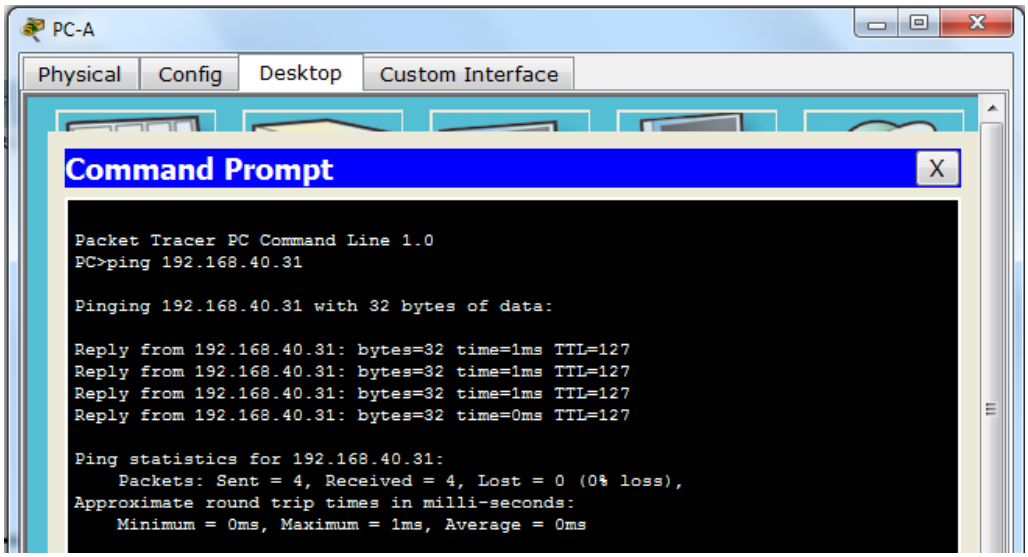


Imagen 10 – Conectividad PC-A a PC-B

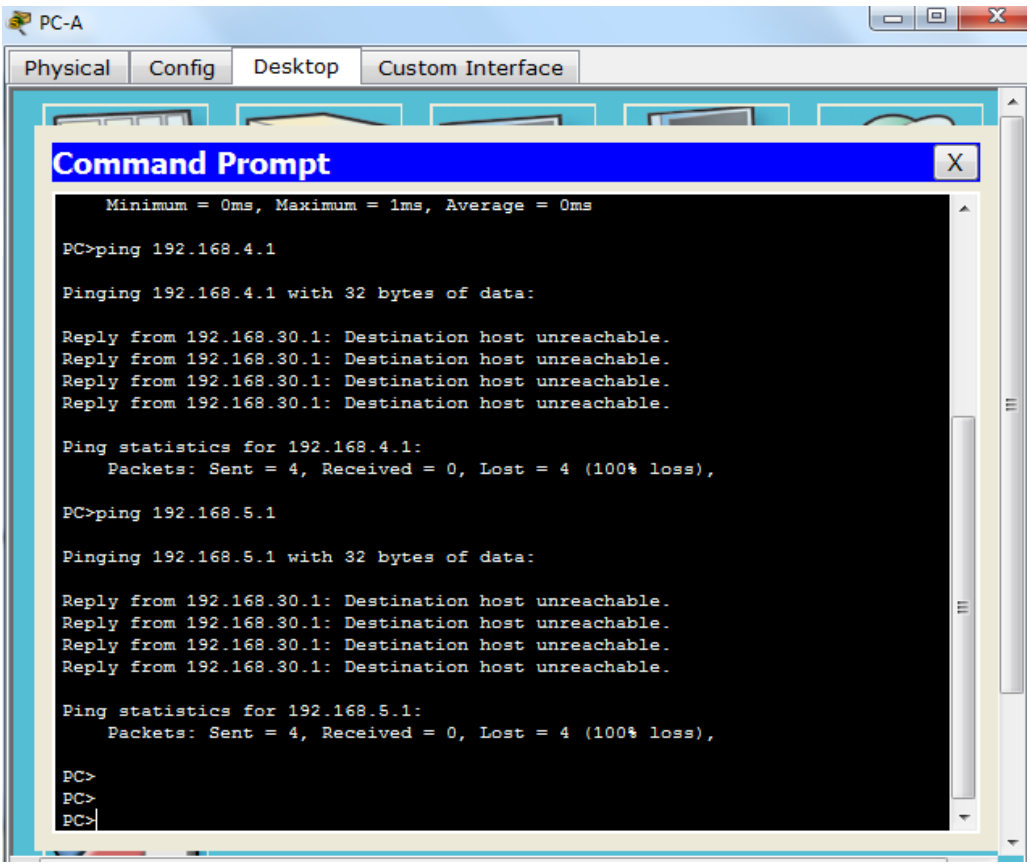


Imagen 11 – Conectividad PC-A a Looback 4 y 5 de R3

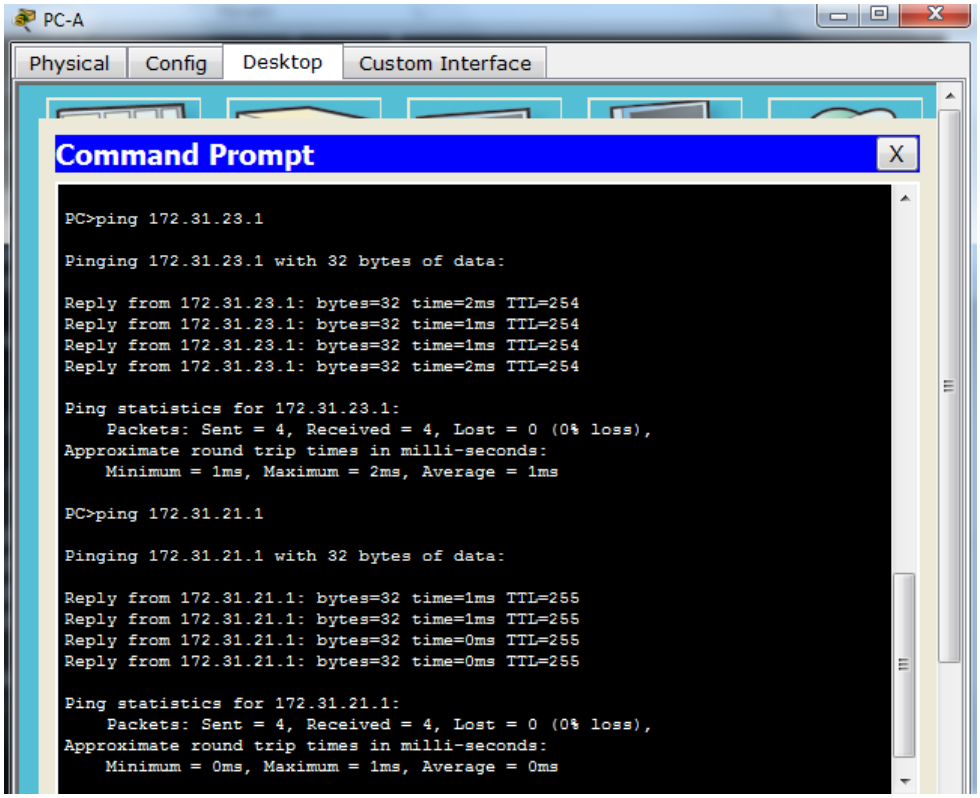


Imagen 12 – Conectividad PC-A a R1, R2 y R3

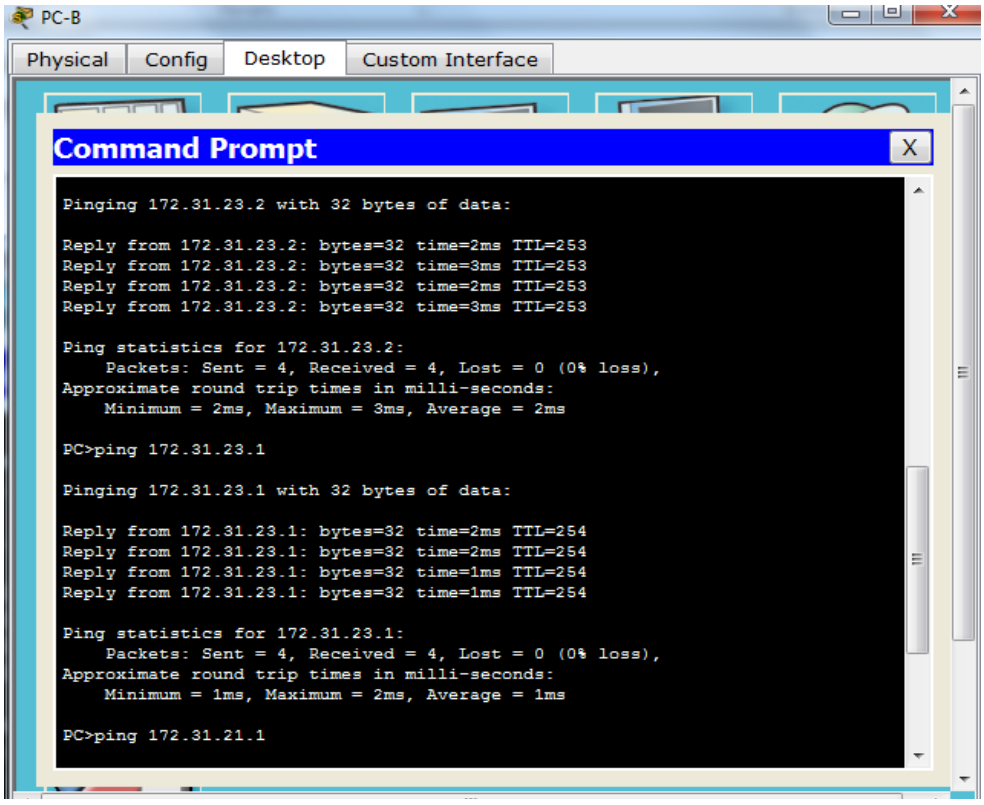


Imagen 13 – Conectividad PC-B a R1, R2 y R3

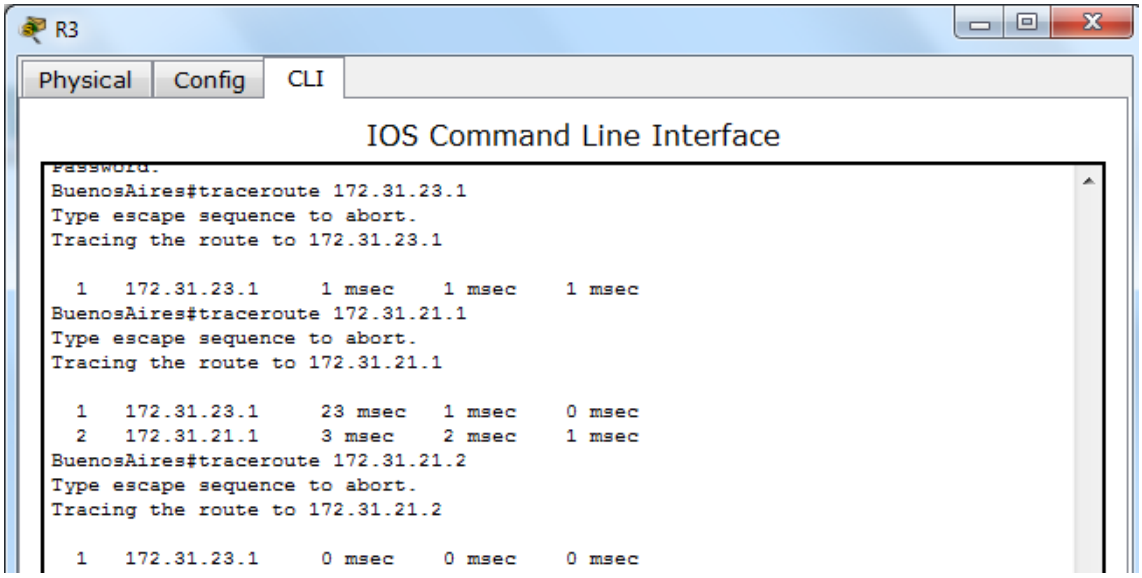


Imagen 14 – Traceroute R3 a R2 y R1

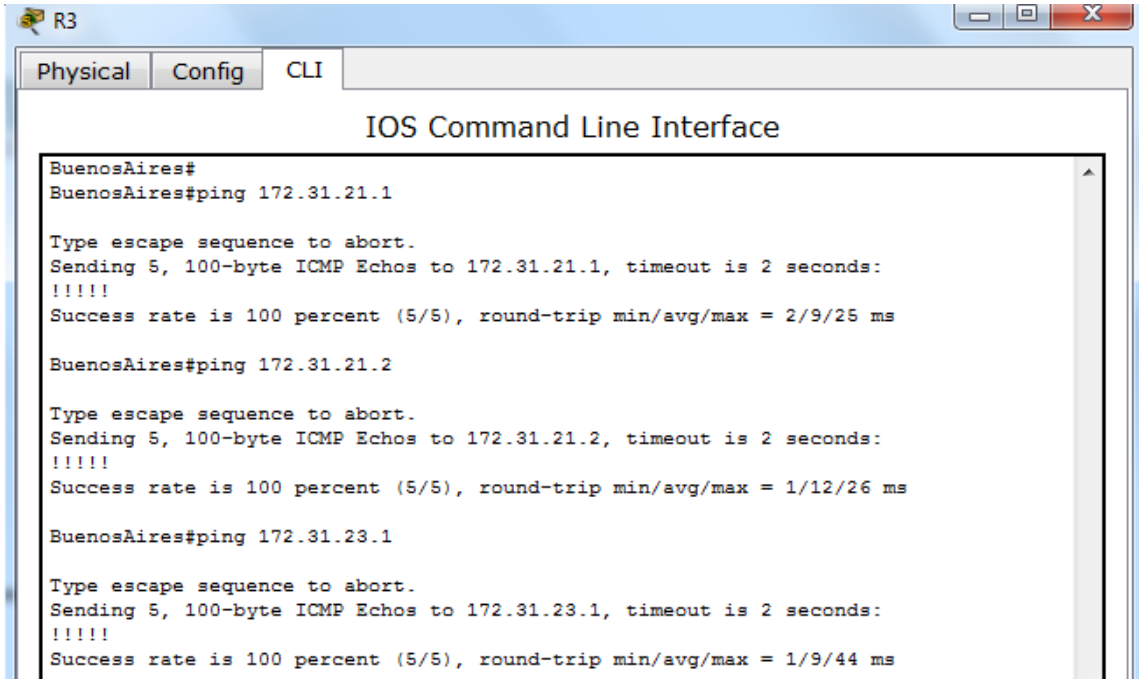


Imagen 15 – Conectividad R3 a R1 y R2

CONCLUSIONES

Con el desarrollo del anterior trabajo se logró dar solución a cada uno de los dos escenarios planteados en la guía evaluativa del diplomado de profundización en Cisco de la Universidad Nacional Abierta y a Distancia. A través del uso de las diferentes herramientas y competencias adquiridas a lo largo de este curso de profundización.

En la problemática establecida para el escenario uno, se logró configurar el direccionamiento IP, se enrutaron cada uno de los dispositivos de la red a través del protocolo RIP, configuración de servicios DHCP entre otros y se establecieron controles para evitar fallas y ataques malintencionados en la configuración y operación de la red tanto para el escenario uno como para el escenario dos.

En el escenario dos se logró conectar a través del direccionamiento IP establecido cada uno de los dispositivos que hacen parte de la red, se configuro el protocolo OSPF V2, los diferentes servicios DHCP, PPP, NAT, redes VLAN entre otros lineamientos de los cuales se disponía en la guía de actividades. Bajos los comandos de conectividad y traceroute se logró evidencias la funcionalidad de ambas redes; esta información puede ser verificada en los archivos correspondientes y en la evidencia reflejada en el contenido del anterior trabajo

Cada uno de los temas de análisis fueron profundizados y aclarados a lo largo del desarrollo del anterior trabajo, dando como resultado el afianzamiento de las competencias y habilidades que fueron adquiridas a lo largo del curso.

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